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Earned Value Management Metrics and Reclamas

Defense Acquisition University

Certification Training | Knowledge Sharing | Continuous Learning | Mission Assistance

Date: September 9, 2015
Presenter: David M. Treshansky
Email Address: david.treshansky@dau.mil

Objectives

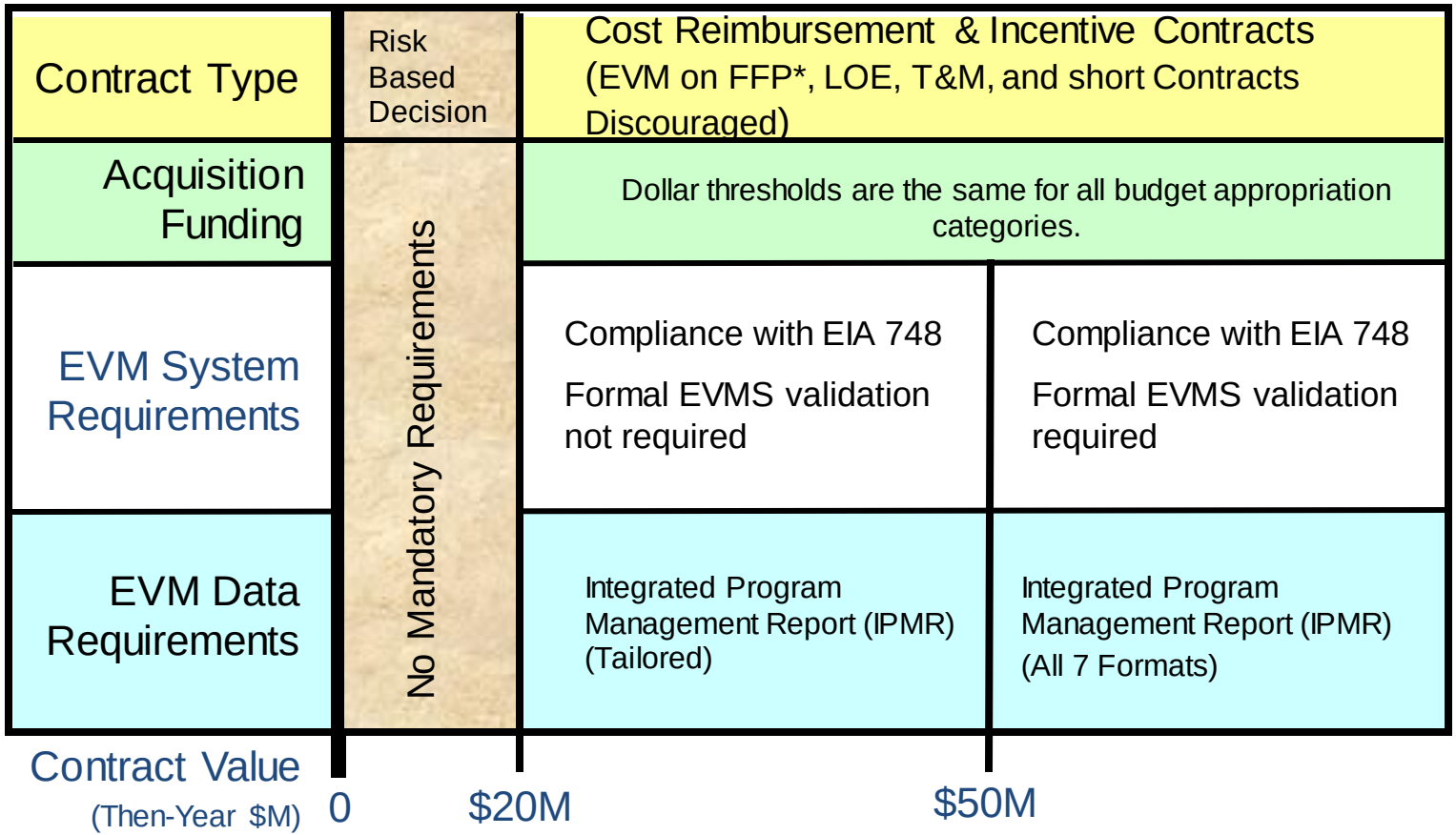
- Part One (1300 – 1400)
  - Review Top Level Earned Value Management (EVM) Policy and Implementation Guidance
  - Discuss How to Calculate and Interpret Common EVM Metrics
- Part Two (1415 – 1515, Ms. Dana Stewart)
  - Classroom #2
  - Discuss Using EVM Metrics in Writing Reclamas

Purpose of Earned Value Management (EVM)

- Identification of Performance Trends
- Early indications of Programmatic Issues
- Forecast Estimates at Completion (EAC)
  - PPBE – Update Funding Plans
- Basis of Contractor Management Actions to influence future cost and schedule performance

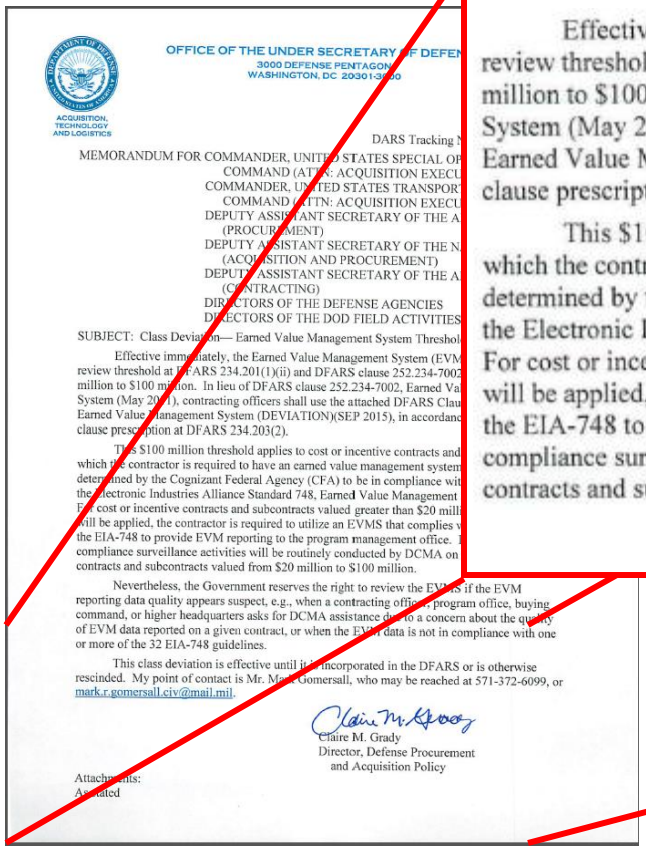
Policies:
OMB Circular A-11, part 7
DODI 5000.02
EVM Standard: EIA Standard 748

DoDI 5000.02 EVM Policy Guidance Required for Contracts > $20M



* Format 6 may be required on FFP

Hot Off the Presses! - Recent Changes in Policy



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WASHINGTON, DC 20301-3000

ACQUISITION, TECHNOLOGY AND LOGISTICS

DARS Tracking N

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DEPUTY ASSISTANT SECRETARY OF THE A
(CONTRACTING)
DIRECTORS OF THE DEFENSE AGENCIES
DIRECTORS OF THE DOD FIELD ACTIVITIES

SUBJECT: Class Deviation— Earned Value Management System Threshol

Effective immediately, the Earned Value Management System (EVM review threshold at DFARS 234.201(1)(ii) and DFARS clause 252.234-7002 million to $100 million. In lieu of DFARS clause 252.234-7002, Earned Va System (May 2011), contracting officers shall use the attached DFARS Clau Earned Value Management System (DEVIATION)(SEP 2015), in accordanc clause prescription at DFARS 234.203(2).

This $100 million threshold applies to cost or incentive contracts and which the contractor is required to have an earned value management system determined by the Cognizant Federal Agency (CFA) to be in compliance wit the Electronic Industries Alliance Standard 748, Earned Value Management For cost or incentive contracts and subcontracts valued greater than $20 mill will be applied, the contractor is required to utilize an EVMS that complies v the EIA-748 to provide EVM reporting to the program management office. compliance surveillance activities will be routinely conducted by DCMA on contracts and subcontracts valued from $20 million to $100 million.

Nevertheless, the Government reserves the right to review the EVMS if the EVM reporting data quality appears suspect, e.g., when a contracting office, program office, buying command, or higher headquarters asks for DCMA assistance due to a concern about the quality of EVM data reported on a given contract, or when the EVM data is not in compliance with one or more of the 32 EIA-748 guidelines.

This class deviation is effective until it is incorporated in the DFARS or is otherwise rescinded. My point of contact is Mr. Mark Gomersall, who may be reached at 571-372-6099, or mark.r.gomersall.civ@mail.mil.

Claire M. Grady
Director, Defense Procurement and Acquisition Policy

Attachments:
As stated

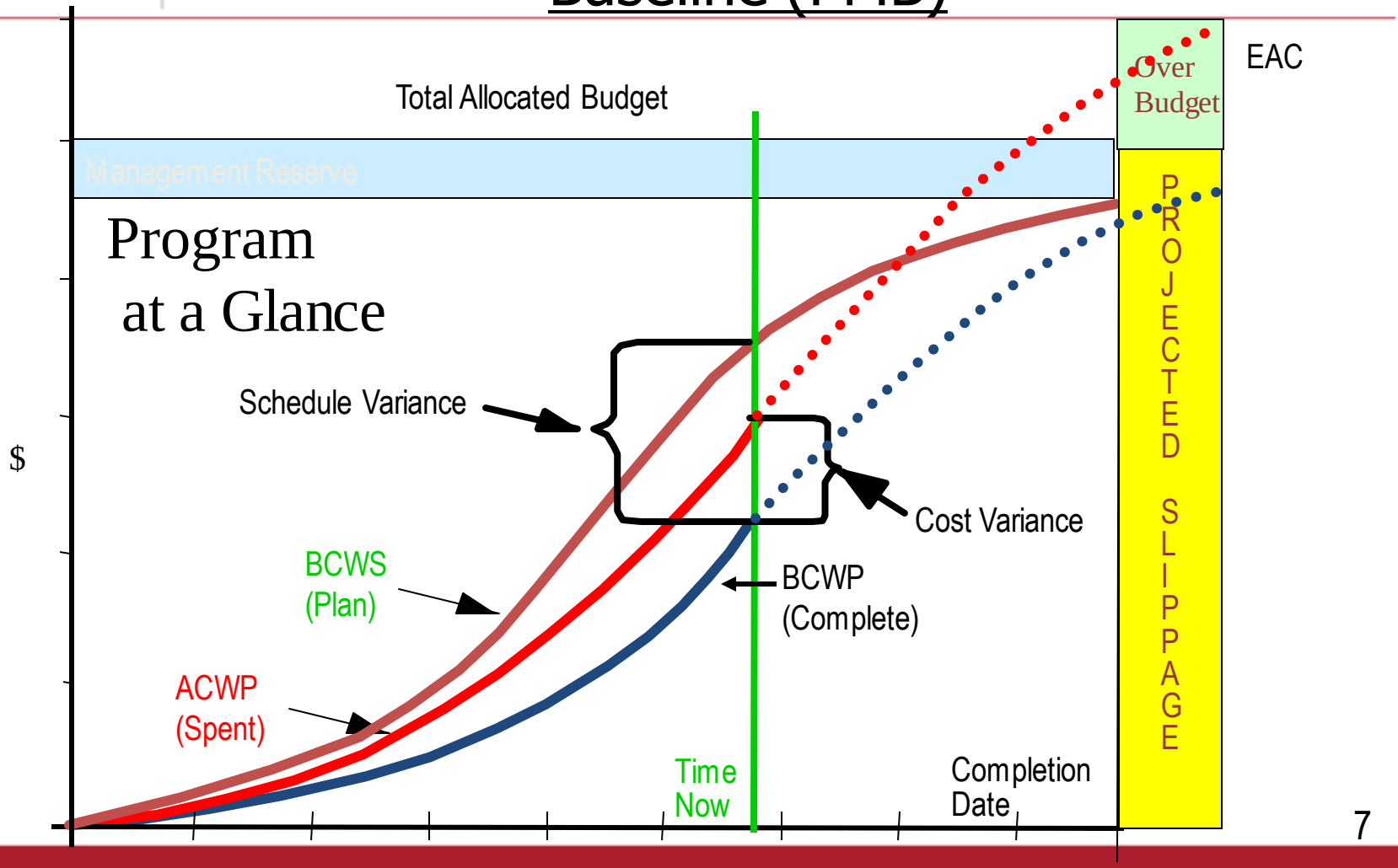
Effective immediately, the Earned Value Management System (EVMS) compliance review threshold at DFARS 234.201(1)(ii) and DFARS clause 252.234-7002 is raised from $50 million to $100 million. In lieu of DFARS clause 252.234-7002, Earned Value Management System (May 2011), contracting officers shall use the attached DFARS Clause 252.234-7002, Earned Value Management System (DEVIATION)(SEP 2015), in accordance with the current clause prescription at DFARS 234.203(2).

This $100 million threshold applies to cost or incentive contracts and subcontracts for which the contractor is required to have an earned value management system that has been determined by the Cognizant Federal Agency (CFA) to be in compliance with the guidelines in the Electronic Industries Alliance Standard 748, Earned Value Management Systems (EIA-748). For cost or incentive contracts and subcontracts valued greater than $20 million for which EVM will be applied, the contractor is required to utilize an EVMS that complies with the guidelines in the EIA-748 to provide EVM reporting to the program management office. However, no EVMS compliance surveillance activities will be routinely conducted by DCMA on cost or incentive contracts and subcontracts valued from $20 million to $100 million.

EARNED VALUE INDEPENDENT VARIABLES

Acronym	Variable	Definition	Meaning
BCWS	Budgeted Cost of Work Scheduled	Time phased estimated value of planned work through any given WBS level and time period	**Planning Baseline -- PMB**
BCWP	Budgeted Cost of Work Performed	Time phased estimated value of completed work through any given level and time period	**Work Accomplishment Earned Value**
ACWP	Actual Cost of Work Performed	Time phased costs incurred for completed work through any given level and time period	**Expenditures "Actuals are Actuals"**
BAC	Budget at Completion	Total estimated value for all work planned through any given level	**Authorized Work**
EAC	Estimate at Completion	Independent cost estimate to complete all work planned through any given level	**Contractor's LRE Forecast Cost**

Performance Measurement Baseline (PMB)



Earned Value Metrics

- Variances
  - Cost and Schedule, Dollars and %
  - Variances At Completion
  - Trends
- Performance Indices
  - % Scheduled – % Spent – % Complete
  - Cost Performance Index (CPI)
  - Schedule Performance Index (SPI)
  - To Complete Performance Index (TCPI)
- Estimates at Complete
  - Tests of Reasonableness

Data is organized by WBS and by Organization; Current Month and Cumulative Data

CV, SV & VAC EARNED VALUE METRICS

Acronym	Metric	Definition	Meaning
SV	Schedule Variance	SV = BCWP - BCWS	Difference between Work Accomplished and Work Scheduled
CV	Cost Variance	CV = BCWP - ACWP	Difference between Planned Cost and Actual Costs
VAC	Variance at Complete	VAC = BAC - EAC	Difference between the Total Budget and the Contractor's Estimate to Complete the Work

Positive is Favorable, Negative is Unfavorable.

% SCHED, COMPLETE, & SPENT EARNED VALUE METRICS

Acronym	Metric	Definition	Meaning
	% Scheduled	$= \frac{BCWS_{Cum}}{BAC} \times 100$	Percentage of Work Scheduled to be Completed
	% Complete	$= \frac{BCWP_{Cum}}{BAC} \times 100$	Percentage of Work Actually Completed
	% Spent	$= \frac{ACWP_{Cum}}{BAC} \times 100$	Percentage of Budget Spent

CPI, SPI & TCPI EARNED VALUE METRICS

Acronym	Metric	Definition	Meaning
SPI	Schedule Performance Index	$SPI = \frac{BCWP}{BCWS}$	Work Accomplishment Efficiency Factor
CPI	Cost Performance Index	$CPI = \frac{BCWP}{ACWP}$	Cost Efficiency Factor
TCPI	To Complete Performance Index	$TCPI = \frac{BAC - BCWP}{EAC - ACWP}$	Required Future Cost Efficiency

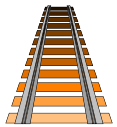
< .95 is Favorable, < .95 is Unfavorable.

EVM Metrics Example

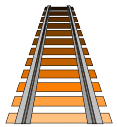
Example -- *Without Earned Value*

- Contract: 4 Miles of Railroad Track in 4 Mos for $4K
- Status: After 3 Mos Only $2K Spent of $3K Planned
- Question: How are You Doing and How Do You Know?

Planned Work $3K



Month 1 @ $1K



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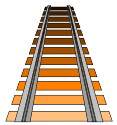
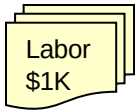
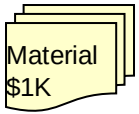


Month 1 @ $1K

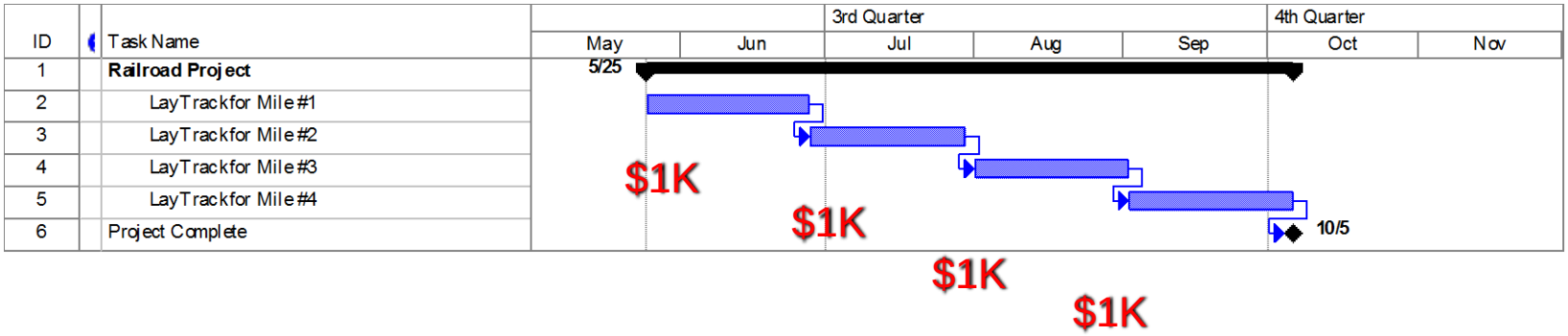
Actual Costs $2K





Performance Measurement Baseline (PMB)

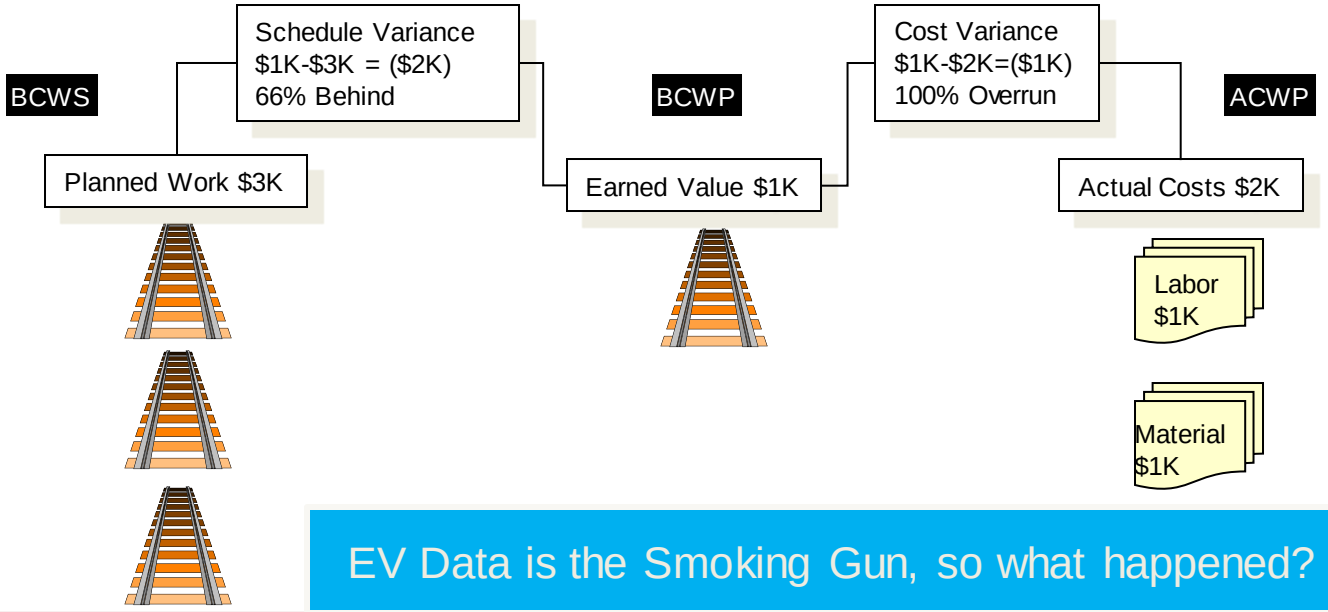
Step 1 – Define all work scope
Step 2 – Schedule the work, and identify interrelationships
Step 3 – Allocate a budget (resources) to each task



Now we're ready to measure progress against the baseline.

Example -- *With Earned Value*

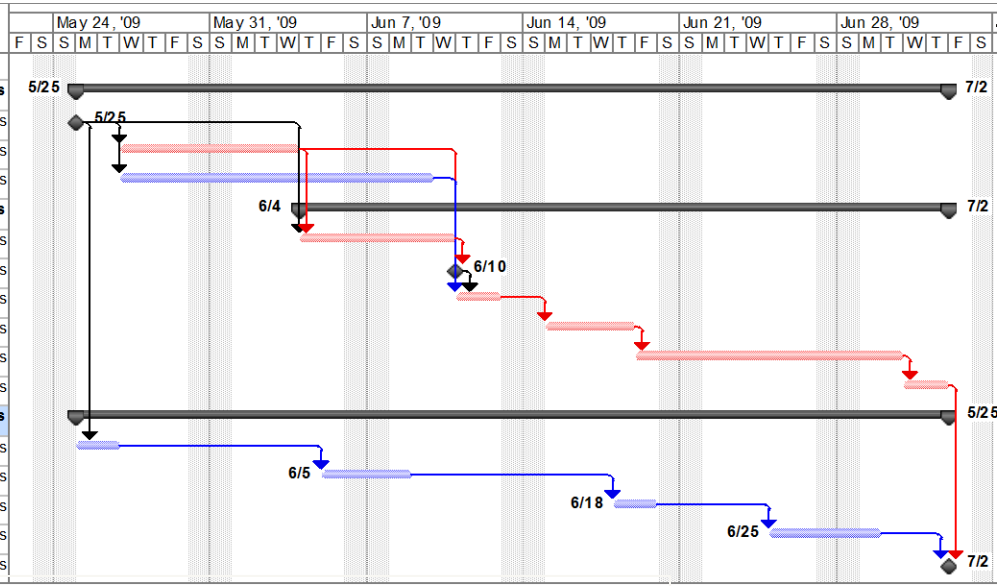
- Contract: 4 Miles of Railroad Track in 4 Mos for $4K
- Status: After 3 Mos Only 1 Mile of Track is Complete yet $2M Spent
- Question: What Would You Tell the PM?



EV Data is the Smoking Gun, so what happened?

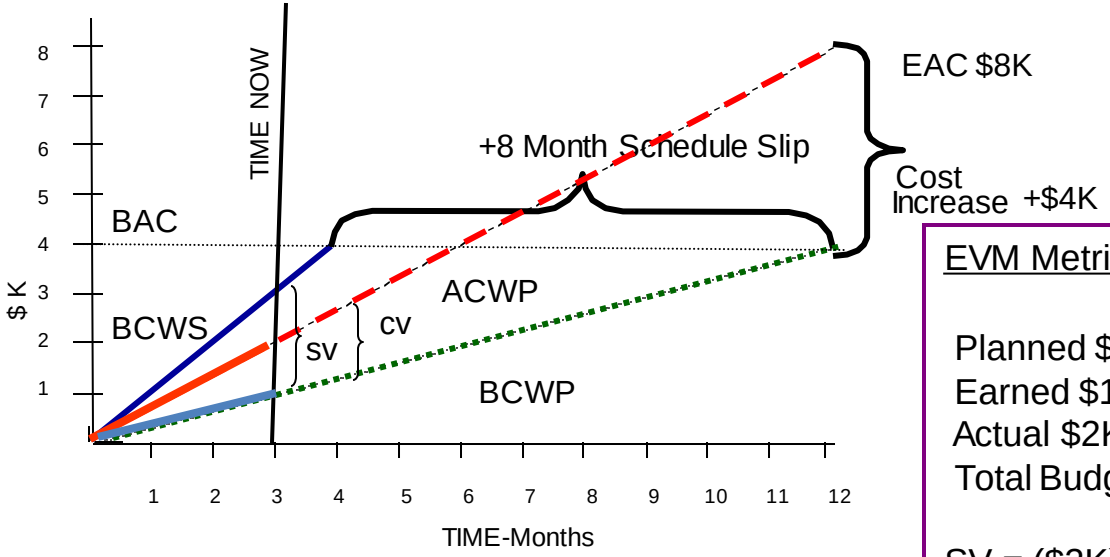
Control Account: Lay RR Track Mile #1 Work Package Plan

ID	Task Name	Duration
1		
2	**RR Lay Track for Mile #1**	**29 days**
3	Contract Award	0 days
4	Conduct Geological Survey	6 days
5	Conduct Environ Impact Assess.	10 days
6	**Materials Order & Fabrication**	**21 days**
7	Order Materials	5 days
8	Materials Arrive	0 days
9	Deliver Materials to Site	2 days
10	Lay out RR Track Materials	4 days
11	Connect RR Track for Mile #1	8 days
12	Inspect RR Track for Mile #1	2 days
13	**Travel Details**	**29 days**
14	Travel to Site for Inspections	2 days
15	Travel to Site for Inspections	2 days
16	Travel to Site for Inspections	2 days
17	Travel to Site for Inspections	3 days
18	Complete RR Track Mile #1	0 days



-- Details for Control Account
-- Identify Critical Path
-- Schedule Drivers and Risk Areas?
-- What is causing delay?
-- Will additional resources be needed?
-- What is the Future impact?

Benefits of Earned Value



Estimate at Completion (EAC) Is:
$8K and 8 Months Late!

EVM Metrics

Planned $3K to date	BCWS
Earned $1K	BCWP
Actual $2K	ACWP
Total Budget $4K	BAC

SV = ($2K)	SPI = 0.33
CV = ($1K)	CPI = 0.50
TCPI = 150%	(Efficiency Needed)

% Planned	= 75%
% Completed	= 25%
% Spent	= 50%

Estimates at Complete

- Compute the EAC (Equation)
- Determine the TCPI
  - Compare to the CPI_{CUM}
  - TCPI EAC Reasonableness Metric
- Compute an independent EAC range from selected CPR data to compare with the reported contractor EACs
  - $EAC_{(CPI\ CUM)}$ (OSD Floor)
  - $EAC_{(CPI\ x\ SPI)}$ (OSD Ceiling)
  - Floor / Ceiling Reasonableness Metric

EAC RESEARCH & TYPES

- **Three recurring themes in EVM Research**
  - Program managers are optimists
  - Program Performance doesn't improve with time
  - EVM indexed based EACs can provide insight into a range for the cost at completion

- **Three categories of EACs**
  - Risk-based EACs – Forward Looking
  - Regression Analyses of curvilinear cost growth
  - EVM Performance Factor based EACs

Risk-based EACs look forward rather than back by computing a most likely cost by applying probabilities of best and worst-case outcomes. Regression-based methods use complex regression analysis to model curvilinear cumulative cost growth. Research done in the mid 1990s, by Dr. Christensen of the Air Force Institute of Technology, found that regression-based methods were no better than EVM index-based formulas.

EAC Realism #1

- **Common Performance Factor Methods**
- **TCPI = To Complete Performance Index Efficiency Necessary To Complete – Either On Budget (BAC) Or On The (EAC).**

$$TCPI_{(BAC)} = \frac{\text{Work Remaining}}{\text{Cost Remaining}} = \frac{BAC - BCWP}{BAC - ACWP}$$

- ***TCPI $_{(BAC)}$ = Work Remaining / Cost Remaining***
- ***TCPI $_{(BAC)}$ = ($4k - $1K) / ($4k - $2K) = $3K / $2K = 150%***

- **Compare CPI & TCPI to Assess Realism Of Future Performance – *"Reality Check #1"***
  - ***TCPI = 150% while CPI = 50%***
  - ***They are earning $0.50 on the dollar spent, and their performance will have to improve to earning $1.50 per dollar spent for the remainder of the contract.***

If TCPI > CPI by .05, Then Question EAC
If TCPI >or< CPI by .10 Then OSD TW tripped

THE EVM EAC EQUATION

The Simple Formula

Estimate at Completion = Money already spent on project + Money you will spend to complete project

$$EAC = ACWP + \frac{\text{Budget Cost of Work Remaining (BCWR)}}{\text{Performance Factor}}$$

$$\textbf{EAC = ACWP + } \frac{\textbf{BAC - BCWP}}{\textbf{Performance Factor}}$$

The earned value EAC formula is based on the simple concept that the estimate at completion is equal to the amount of money already spent on the contract plus the amount of money it will take to complete the contract. Translating this into the language of earned value; money already spent is ACWP, and money needed to complete the contract is based on budget cost of work remaining or BCWR divided by a performance factor.

PERFORMANCE FACTORS

Single Index

- CPI_{cum}
- CPI_{cur}
- $CPI_{3\ mth}$
- $CPI_{6\ mth}$
- SPI_{cum}
- SPI_{cur}
- Performance Factor

Composite

- $(CPI_{cum} \bullet SPI_{cum})$
- $MICOM - (CPI_{6mth} \bullet SPI_{cum})$

Weighted

- $(.8 \bullet CPI_{cum}) + (.2 \bullet SPI_{cum})$
- $(.4 \bullet CPI_{factory}) + (.4 \bullet CPI_{test}) + (.2 \bullet CPI_{quality})$

$$EAC = ACWP + \frac{BAC - BCWP}{Performance\ Factor}$$

The cost performance index and the schedule performance index are the primary EV metrics associated with EAC performance factors. Performance factors take one of three forms: 1) the single index performance; 2) the composite index; and 3) the weighted index performance factor. An EAC range is established by applying different performance factors to the EAC equation.

VERIFYING THE CONTRACTOR'S EAC IS REASONABLE

Unclassified

CLASSIFICATION *(When filled in)*

COST PERFORMANCE REPORT
FORMAT 1 - WORK BREAKDOWN STRUCTURE DOLLARS IN Thousands

1. CONTRACTOR	2. CONTRACT		3. PROGRAM	4. REPORT PERIOD
a. NAME Increda, Corp	a. NAME LAR SDD 2003		a. NAME LAR Vehicle	a. FROM *(YYMMDD)* 031129
b. LOCATION *(Address and ZIP Code)* 1100 W. HOLLYMOLLY ST. LOS ANGELES, CA 90293	b. NUMBER DAAH01-03-C-0076			b. TO *(YYMMDD)* 031231
	c. TYPE CPIF	d. SHARE RATIO 50/50 30/70	b. PHASE *(X one)* ☐ RDT&E ☐ PRODUCTION	

5. CONTRACT DATA							
a. QUANTITY	b. NEGOTIATED COST	c. EST. COST AUTH UNPRICED WORK	d. TARGET PROFIT/ FEE	e. TARGET PRICE	f. ESTIMATED PRICE	g. CONTRACT CEILING	h. ESTIMATED CONTRACT CEILING
4/0/4	$64,711.5	$0.0	$7700.7 / 11.9%	$72,412.2	$70,301.8	$75,475.7	$75,475.7

6. ESTIMATED COST AT COMPLETION	MANAGEMENT ESTIMATE AT COMPLETION(1)	CONTRACT BUDGET BASE (2)	VARIANCE (3)
a. BEST CASE	$59,512.6		
b. WORST CASE	$64,711.5		
c. MOST LIKELY	$63,378.7	$64,711.5	$1,332.8

7. AUTHORIZED CONTRACTOR REPRESENTATIVE		
a. NAME *(Last, First, Middle Initial)* Pop I Smith	b. TITLE Program Manager	
c. SIGNATURE *Pop I Smith*		d. DATE SIGNED *(YYMMDD)* 040130

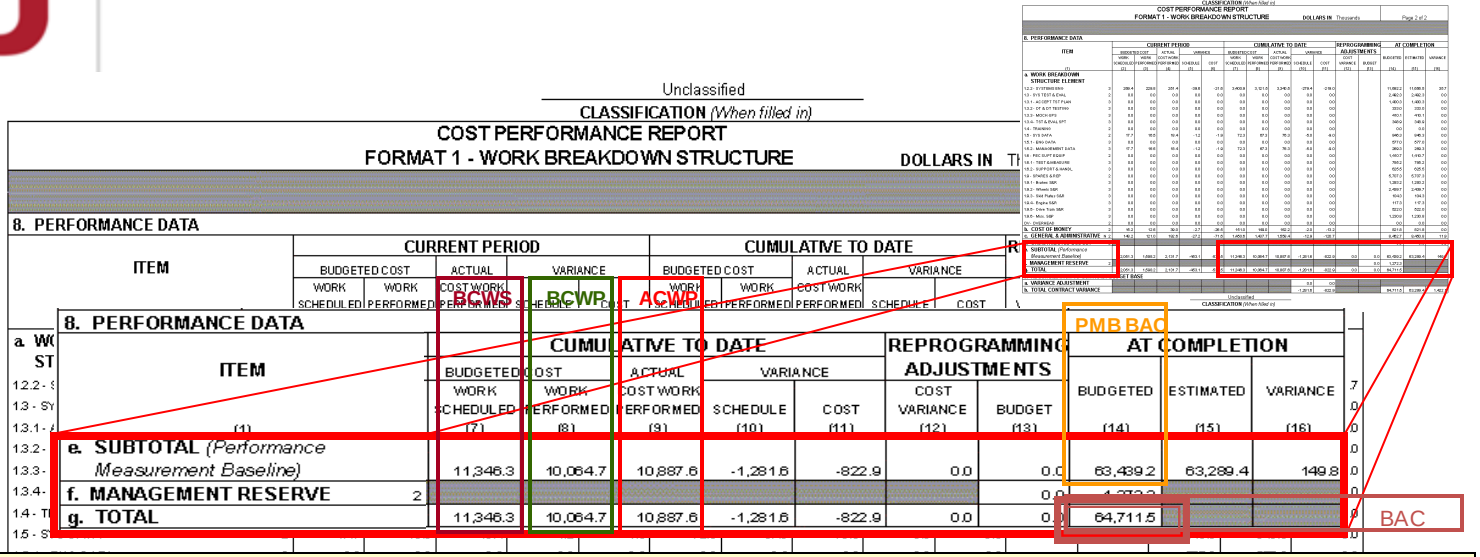
8. PERFORMANCE DATA

ITEM		CURRENT PERIOD					CUMULATIVE TO DATE					REPROGRAMMING ADJUSTMENTS		AT COMPLETION		
		BUDGETED COST		ACTUAL	VARIANCE		BUDGETED COST		ACTUAL	VARIANCE						
		WORK SCHEDULED	WORK PERFORMED	COST WORK PERFORMED	SCHEDULE	COST	WORK SCHEDULED	WORK PERFORMED	COST WORK PERFORMED	SCHEDULE	COST	COST VARIANCE	BUDGET	BUDGETED	ESTIMATED	VARIANCE
(1)		(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
a. WORK BREAKDOWN STRUCTURE ELEMENT																
1.1 - PRIME VEHICLE	2	1,722.7	1,353.1	1,775.0	-369.6	-421.9	6,829.2	5,874.0	6,410.3	-955.2	-536.3			36,317.4	36,187.8	129.6
1.1.1 - FRAME	3	139.8	116.1	119.1	-23.7	-3.0	492.5	430.8	478.7	-61.7	-47.9			2,709.7	2,708.8	0.9
1.1.2 - SUSPENSION/STR	3	390.8	279.4	352.4	-111.4	-73.0	1,346.2	1,019.4	1,149.0	-326.8	-129.6			8,114.0	8,117.2	-3.2
1.1.3 - POWER PACKAGE	3	518.1	527.7	754.8	9.6	-227.1	1,771.7	2,046.0	2,153.8	274.3	-107.8			11,661.5	11,553.5	108.0
1.1.3.1 - ENGINE	4	168.2	161.3	263.0	-6.9	-101.7	575.3	625.1	722.5	49.8	-97.4			4,081.5	4,043.7	37.8
1.1.3.10 - COOLING SYS	4	107.7	93.0	168.3	-14.7	-75.3	368.1	360.5	462.2	-7.6	-101.7			2,332.3	2,310.7	21.6
1.1.3.9 - EXHAUST SYS	4	80.8	71.0	71.0	-9.8	0.0	276.2	275.7	275.7	-0.5	0.0			1,749.2	1,733.0	16.2
1.1.3.A - OTHER	4	161.4	202.4	252.5	41.0	-50.1	552.1	784.7	693.4	232.6	91.3			3,498.5	3,466.1	32.4
1.1.4 - AUXILIARY AUTO	3	6.3	0.4	8.5	-5.9	-8.1	13.7	3.6	13.1	-10.1	-9.5			283.5	283.5	0.0
1.1.5 - ARMAMENT	3	297.1	190.6	185.7	-106.5	4.9	1,915.6	1,480.1	1,620.1	-435.5	-140.0			4,159.5	4,161.7	-2.2
1.1.6 - BODY/CAB	3	300.0	182.3	280.6	-117.7	-98.3	1,076.2	706.8	770.4	-369.4	-63.6			3,887.2	3,851.2	36.0
1.1.7 - COMMUNICATIONS	3	50.5	56.6	69.3	6.1	-12.7	185.1	187.3	206.8	2.2	-19.5			1,927.7	1,937.2	-9.5
1.1.8 - INTEG & ASSEM	3	20.1	0.0	4.6	-20.1	-4.6	28.2	0.0	18.4	-28.2	-18.4			3,574.3	3,574.7	-0.4
1.2 - SYS PROGRAM MGT	2	295.7	216.1	299.3	-79.6	-83.2	4,293.8	3,974.4	4,238.8	-319.4	-264.4			15,843.4	15,823.2	20.2
1.2.1 - PROJECT MGMT	3	26.3	-13.7	47.9	-40.0	-61.6	892.9	852.9	898.3	-40.0	-45.4			4,151.2	4,166.7	-15.5

Unclassified

CLASSIFICATION *(When filled in)*

COMPUTING AN EVM EAC RANGE FOR THE CONTRACT



$$CPI = \frac{BCWP}{ACWP} = \frac{10064.7}{10887.6} = 0.92 \qquad SPI = \frac{BCWP}{BCWS} = \frac{10064.7}{11346.3} = 0.89$$

$$EAC = ACWP + \frac{BAC - BCWP}{\text{Performance Factor}}$$

EAC Floor

$$EAC = ACWP + \frac{BAC - BCWP}{CPI\,cum}$$

EAC Ceiling

$$EAC = ACWP + \frac{BAC - BCWP}{CPIcum \times SPIcum}$$

COMPUTING AN EVM EAC RANGE FOR THE CONTRACT

Unclassified

CLASSIFICATION *(When filled in)*

COST PERFORMANCE REPORT
FORMAT 1 - WORK BREAKDOWN STRUCTURE — DOLLARS IN Thousands — Page 2 of 2

8. PERFORMANCE DATA

ITEM	CURRENT PERIOD: BUDGETED COST WORK SCHEDULED	CURRENT PERIOD: BUDGETED COST WORK PERFORMED	CURRENT PERIOD: ACTUAL COST WORK PERFORMED	CURRENT PERIOD: VARIANCE SCHEDULE	CURRENT PERIOD: VARIANCE COST	CUMULATIVE TO DATE: BUDGETED COST WORK SCHEDULED	CUMULATIVE TO DATE: BUDGETED COST WORK PERFORMED	CUMULATIVE TO DATE: ACTUAL COST WORK PERFORMED	CUMULATIVE TO DATE: VARIANCE SCHEDULE	CUMULATIVE TO DATE: VARIANCE COST	REPROGRAMMING ADJUSTMENTS: COST VARIANCE	REPROGRAMMING ADJUSTMENTS: BUDGET	AT COMPLETION: BUDGETED	AT COMPLETION: ESTIMATED	AT COMPLETION: VARIANCE
	(1)					(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
e. SUBTOTAL *(Performance Measurement Baseline)*						11,346.3	10,064.7	10,887.6	-1,281.6	-822.9	0.0	0.0	63,439.2	63,289.4	149.8
f. MANAGEMENT RESERVE	2											0.0	1,272.3		
g. TOTAL						11,346.3	10,064.7	10,887.6	-1,281.6	-822.9	0.0	0.0	64,711.5		

BCWS BCWP ACWP PMB BAC BAC

$$CPI = \frac{BCWP}{ACWP} = \frac{10064.7}{10887.6} = 0.92 \qquad SPI = \frac{BCWP}{BCWS} = \frac{10064.7}{11346.3} = 0.89$$

$$EAC = ACWP + \frac{BAC - BCWP}{\text{Performance Factor}} \qquad TCPI = \frac{BAC - BCWP}{EAC - ACWP} = \frac{63439.2 - 10064.7}{63378.7 - 10887.6} = 1.017$$

EAC Floor

$$EAC = ACWP + \frac{BAC - BCWP}{CPI\,cum} = 10887.6 + \frac{64711.5 - 10064.7}{0.92}$$

EAC Ceiling

$$EAC = ACWP + \frac{BAC - BCWP}{CPIcum \times SPIcum} = 10887.6 + \frac{64711.5 - 10064.7}{0.92 \times 0.89}$$

= 70,002.4K
EVM
EAC Range
= 77,529.8 K

Unclassified

CLASSIFICATION *(When filled in)*

COMPUTING AN EVM EAC RANGE FOR THE CONTRACT

Unclassified

CLASSIFICATION *(When filled in)*

COST PERFORMANCE REPORT
FORMAT 1 - WORK BREAKDOWN STRUCTURE — DOLLARS IN Thousands — Page 2 of 2

8. PERFORMANCE DATA

ITEM	CURRENT PERIOD: BUDGETED COST WORK SCHEDULED	CURRENT PERIOD: BUDGETED COST WORK PERFORMED	CURRENT PERIOD: ACTUAL COST WORK PERFORMED	CURRENT PERIOD: VARIANCE SCHEDULE	CURRENT PERIOD: VARIANCE COST	CUMULATIVE TO DATE: BUDGETED COST WORK SCHEDULED	CUMULATIVE TO DATE: BUDGETED COST WORK PERFORMED	CUMULATIVE TO DATE: ACTUAL COST WORK PERFORMED	CUMULATIVE TO DATE: VARIANCE SCHEDULE	CUMULATIVE TO DATE: VARIANCE COST	REPROGRAMMING ADJUSTMENTS: COST VARIANCE	REPROGRAMMING ADJUSTMENTS: BUDGET	AT COMPLETION: BUDGETED	AT COMPLETION: ESTIMATED	AT COMPLETION: VARIANCE
	(1)					(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
e. SUBTOTAL *(Performance Measurement Baseline)*						11,346.3	10,064.7	10,887.6	-1,281.6	-822.9	0.0	0.0	63,439.2	63,289.4	149.8
f. MANAGEMENT RESERVE	2											0.0			
g. TOTAL						11,346.3	10,064.7	10,887.6	-1,281.6	-822.9	0.0	0.0	64,711.5		

BCWS BCWP ACWP PMB BAC BAC

$$CPI = \frac{BCWP}{ACWP} = \frac{10064.7}{10887.6} = 0.92 \qquad SPI = \frac{BCWP}{BCWS} = \frac{10064.7}{11346.3} = 0.89$$

$$EAC = ACWP + \frac{BAC - BCWP}{\text{Performance Factor}} \qquad TCPI = \frac{BAC - BCWP}{EAC - ACWP} = \frac{63439.2 - 10064.7}{63378.7 - 10887.6} = 1.017$$

EAC Floor

$$EAC = ACWP + \frac{BAC - BCWP}{CPI\,cum} = 10887.6 + \frac{64711.5 - 10064.7}{0.92}$$

EAC Ceiling

$$EAC = ACWP + \frac{BAC - BCWP}{CPIcum \times SPIcum} = 10887.6 + \frac{64711.5 - 10064.7}{0.92 \times 0.89}$$

= 70,002.4K
EVM
EAC Range
= 77,529.8 K

Contractor EAC is Optimistic

- EAC of 63,378.7 K less than EVM EAC Range
- TCPI = 1.017 > (0.92 +0.05)

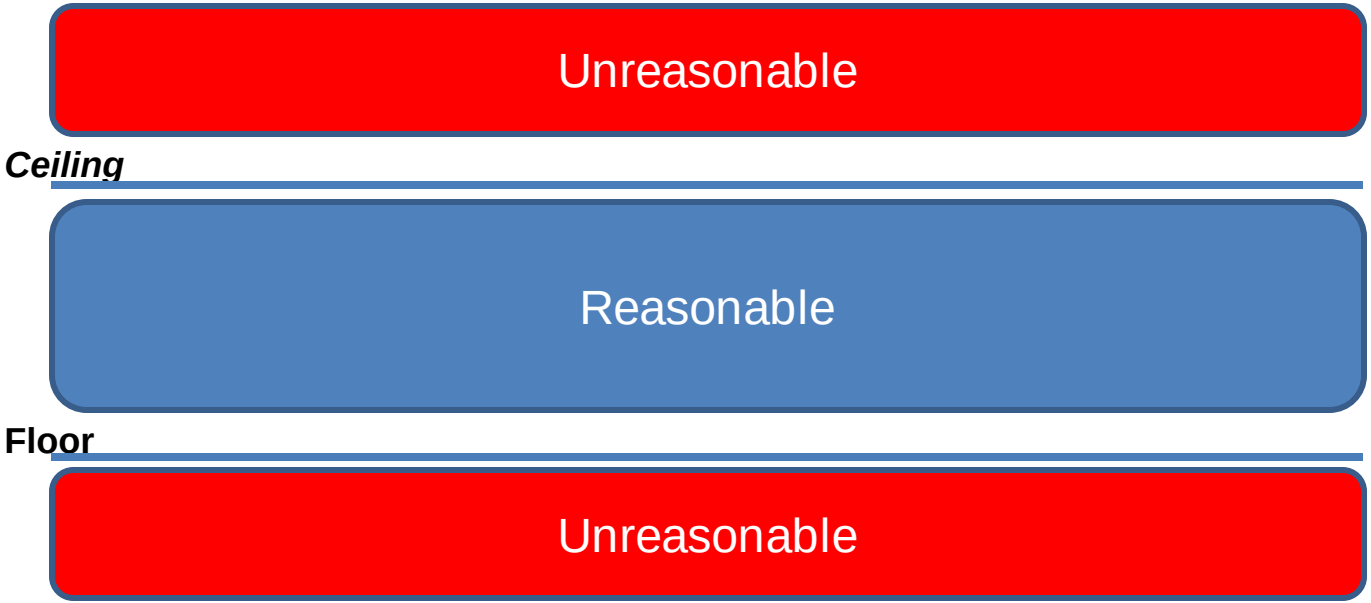
Unclassified

CLASSIFICATION *(When filled in)*

EAC Realism #2

- Compute the EAC using the Performance Factor of CPI_{CUM} (Floor)
- Compute the EAC using the Performance Factor of CPI_{CUM} X SPI_{CUM} (Ceiling)

- Compare the Contractor's EAC to Both the Floor and Ceiling EACs to Assess Realism of the Forecasted EAC – *"Reality Check #2"*



Trip Wire Metrics

TRIP WIRE METRICS

- **Primary Trip Wire Metrics**

1. - System Indicator – EVM System Certification
2. - Integrated Baseline Development Indictor – IBR within 6 months of contract award; cost, schedule, & technical risk identified and quantified at IBR

- **Secondary Trip Wire Metrics**

1. - CPI and SPI – cum index < .95
2. - Task Hit % – shows % of tasks completed on or ahead of baseline date; Current index < .95
3. - Baseline Execution Index (BEI) = # baseline tasks actually completed/ # baseline tasks scheduled for completion; cum index < .95
4. - Critical Path Length Index (CPLI) of PMB = (Remaining critical path duration + float duration (to baseline finish))/Remaining critical path duration; cum index < .95
5. - To Complete Performance Index (TCPI) = Work Remaining/Cost Remaining; CPI to TCPI delta of > 10%
6. - PMB Revisions – compared to monthly PMB value; delta of > 5%
7. - Contract Mods – compared to original base value; delta of > 10%

Recent EVM Events and Future plans

- IPMR Implementation guide
- DODI 5000.02 Update
- EVMS Interpretation Guide
- BBPi 3.0
- Proposed EVM DFARS Clause Changes
  - EVM Implementation remains at $20M or greater
  - EVMS Validation AND Surveillance not required until greater than $100M

EVM Training and Analysis Resources

- DAU - Defense Acquisition University
  - Expert Advice and Tailored Workshops (your project)
  - Gold Card - Summary of EVM Techniques
  - Continuous Learning Modules
  - EVM Community of Practice
    - Acquisition Community Connection: http://acc.dau.mil/evm
- OSD – Program Assessment & Root cause Analysis (PARCA)
- DCMA - Defense Contract Management Agency
  - Onsite contractor Surveillance & Expertise
  - Control Account Manager (CAM) Interviews
  - Verification of Policy Compliance
- wInsight – EVM Data Analysis Tool
- Schedule Analysis Tools – Critical Path

- ✓ EVM Training
- ✓ IMS Training and Workshops
- ✓ IBR Training and Workshops
- ✓ Getting EVM into the RFP and onto the Contract

EVM Homepage: http://www.acq.osd.mil/pm/

Questions

Back ups

Cost Performance Status as of 31 Aug 08 PEO Chart - SAMPLE

PERFORMANCE & FORECAST

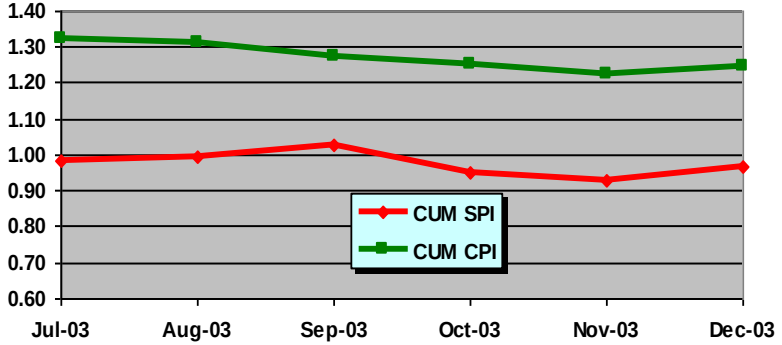
December 03 was month 8 of a 19 month CPFF baseline (Nov 04). Contract award was XXXX.

Work Scheduled	44%
Work Completed	42%
Funds Expended	31%
TCPI (BAC)	.77

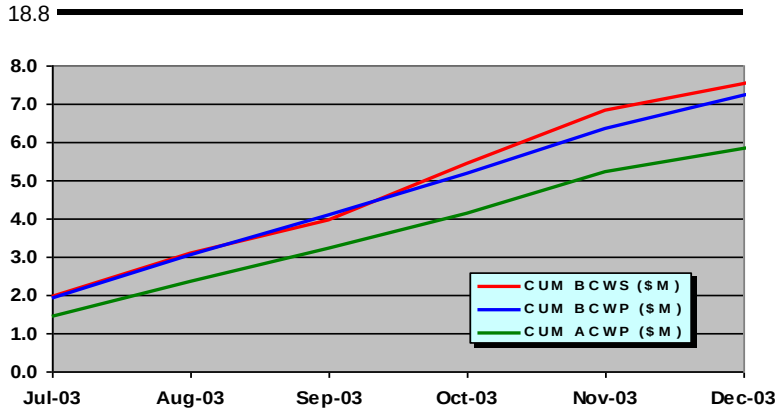
CPI	SPI	CV	SV
1.24	.96	$1,423K	($267K)

($M)	Cost	Price
Target	18.8	20.4
Ktr LRE	18.8	20.4
PM EAC	18.8	20.4
CAD EAC	18.8	20.4
Overrun	---	---

CUM PERFORMANCE INDICES



S-CURVE ($M)



COST & SCHEDULE DRIVERS

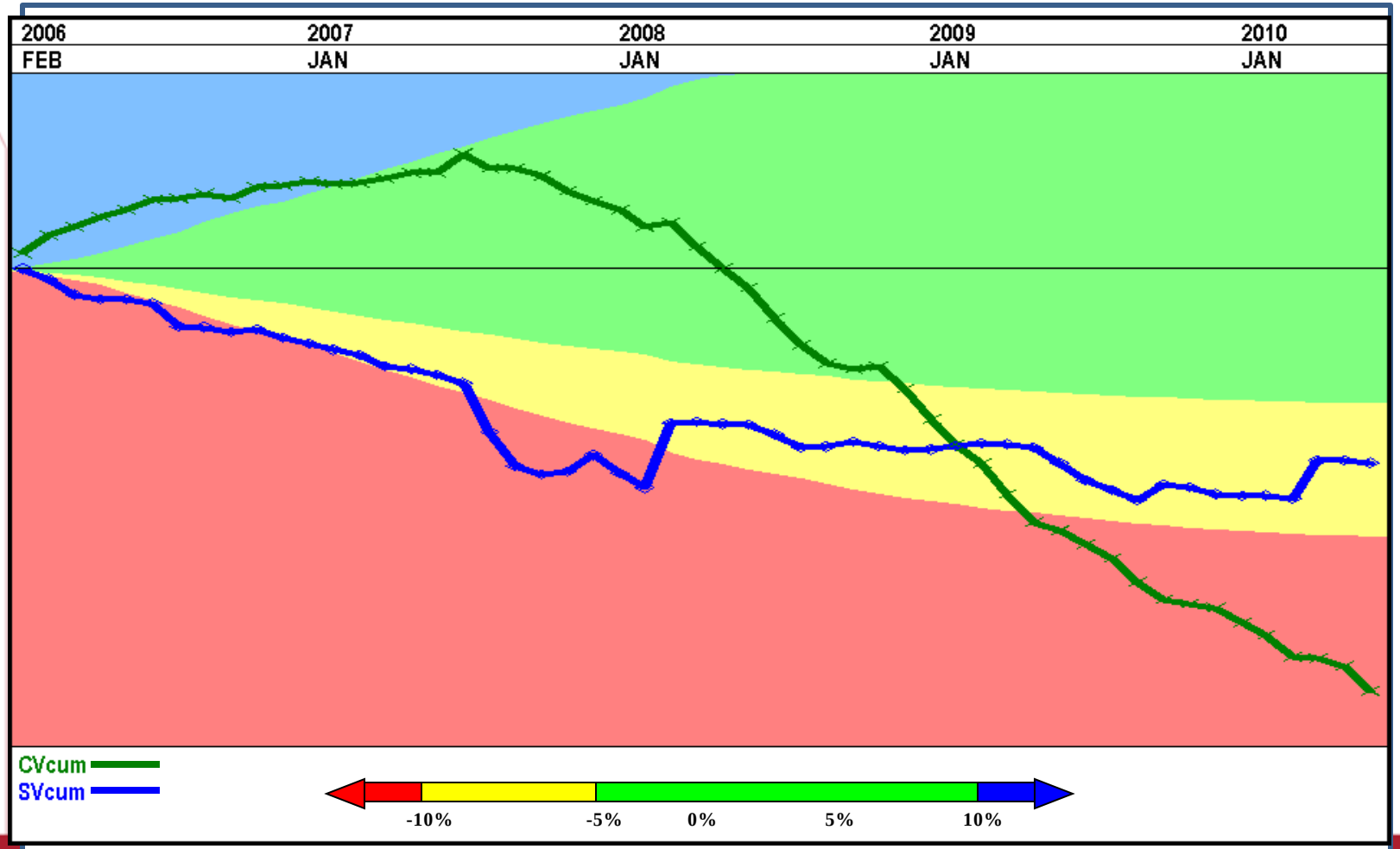
Schedule Drivers:

Launcher Development	($116K)
System Tests	($70K)

Cost Drivers:

Fire Control System	$203K
Product Assurance/Test Management	$172K
General & Administrative	$168K
System Tests	$162K
LMI, Prov, PHS&T, Life Cycle	$133K
Software FQT	$106K

CUMULATIVE VARIANCE FROM INCEPTION
(in Dollars)



EVM RELATED DATA ITEM DESCRIPTIONS (DIDS)

Contract Performance Report - DI-MGMT-81466A

Integrated Master Schedule – DI-MGMT-81650

Consolidated for implementation on solicitations issued after July 1, 2012
Integrated Program Management Report (IPMR)
DI-MGMT-81861

IPMR Formats

- Format 1 – Work Breakdown Structure (WBS)
- Format 2 – Organizational Breakdown Structure (OBS)
- Format 3 – Baseline Data
- Format 4 – Manpower Data
- Format 5 – Variance Analyses
- Format 6 – IMS
- Format 7 – Electronic History and Forecast File (annual)

EVM provides an Objective means by which to Evaluate Contract Performance

Format 1 Changes

- Data in XML in whole units (no decimal)
- Reporting and variance analysis level defined as WBS level established by tailoring appropriate MILSTD 881 appendix and applies only to Formats 1 & 5. Otherwise, default to Control Account level for XML data
- AUW & UB: Clarified.
- AUW can never be a negative value
- UB can never by negative
- De-scoped efforts not yet reflected in the CBB shall have estimated value reported in Format 5
- Contractor EAC– Best/Worst/Most Likely more clearly defined
- Contractor ML EAC must reconcile to CFSR
- Prescribes that assumptions, conditions, and methodology underlying WC estimate shall be explained in Format 5 if value is different from ML EAC
- COM and G&A: Added option for Govt to specify exclusion in CDRL of COM and G&A in WBS (add/non-add)

Sample Performance Report – Format 1

Unclassified

CLASSIFICATION (When Filled In)

Boxes 1 - 4

CONTRACT PERFORMANCE REPORT
FORMAT 1 - WORK BREAKDOWN STRUCTURE

DOLLARS IN THOUSANDS

Key Contract & Contractor Data

1. CONTRACTOR	2. CONTRACT	3. PROGRAM	4. REPORT PERIOD
a. NAME Increda, Corp	a. NAME LAR DEC 2003	a. NAME LAR Vehicle	a. FROM (YYYYMMDD) 20031129
b. LOCATION (Address and ZIP Code) 1000 W Hollymolly St, Los Angeles, CA 90293	b. NUMBER DAAH01-03-C-0076	b. PHASE SDD	
	c. TYPE CPIF; d. SHARE RATIO 50/50 30/70	c. EVMS ACCEPTANCE NO YES X (YYYYMMDD) 19850519	b. TO (YYYYMMDD) 20031231

Box 5

New OTB/OTS Box

a. QUANTITY	b. NEGOTIATED COST	c. ESTIMATED COST OF AUTHORIZED UNPRICED WORK	d. TARGET PROFIT/FEE	e. TARGET PRICE	f. ESTIMATED PRICE	g. CONTRACT CEILING	h.	i. DATE OF OTB/OTS (YYYYMMDD)
40/4	$64,711.5	$0.00	$7,700 / 11.9%	$72,412.2	$70,301.80	$75,475.7		

Box 6

Box 7

Budget and EAC Data

6. ESTIMATED COST AT COMPLETION	MANAGEMENT ESTIMATE AT COMPLETION (1)	CONTRACT BUDGET BASE (2)	VARIANCE (3)
a. BEST CASE	$59,512.6		
b. WORST CASE	$64,711.5		
c. MOST LIKELY	$63,378.7	$64,711.5	$1,332.8

7. AUTHORIZED CONTRACTOR REPRESENTATIVE

a. NAME (Last, First, Middle Initial) Smith, Pop, I

b. TITLE LAR Program

c. SIGNATURE *Pop I Smith*

d. DATE SIGNED (YYYYMMDD) 20040115

Box 8

ITEM (1)	CURRENT PERIOD: BUDGETED COST WORK SCHEDULED (2)	CURRENT PERIOD: BUDGETED COST WORK PERFORMED (3)	CURRENT PERIOD: ACTUAL COST WORK PERFORMED (4)	CURRENT PERIOD: VARIANCE SCHEDULE (5)	CURRENT PERIOD: VARIANCE COST (6)	CUMULATIVE TO DATE: BUDGETED COST WORK SCHEDULED (7)	CUMULATIVE TO DATE: BUDGETED COST WORK PERFORMED (8)	CUMULATIVE TO DATE: ACTUAL COST WORK PERFORMED (9)	CUMULATIVE TO DATE: VARIANCE SCHEDULE (10)	CUMULATIVE TO DATE: VARIANCE COST (11)	REPROGRAMMING ADJUSTMENTS: COST VARIANCE (12a)	REPROGRAMMING ADJUSTMENTS: SCHEDULE VARIANCE (12b)	REPROGRAMMING ADJUSTMENTS: BUDGET (13)	AT COMPLETION: BUDGETED (14)	AT COMPLETION: ESTIMATED (15)	AT COMPLETION: VARIANCE (16)
a. WORK BREAKDOWN STRUCTURE ELEMENT	BCWS	BCWP	ACWP	SV	CV	BCWS	BCWP	ACWP	SV	CV				BAC	EAC	VAC
1.1 PRIME VEHICLE	1,722.7	1,353.1	1,775.0	-369.6	-421.9	6,829.2	5,874.0	6,410.3	-955.2	-536.3				36,317.4	36,187.8	129.6
1.1.1 FRAME	139.8	116.1	119.1	-23.7	-3.0	492.5	430.8	478.7	-61.7	-47.9				2,709.7	2,708.8	0.9
1.1.2 SUSPENSION/STR	390.8	279.4	352.4	-111.4	-73.0	1,346.2	1,019.4	1,149.0	-326.8	-129.6				8,114.0	8,117.2	-3.2
1.1.3 POWER PACKAGE	518.1													11,661.5	11,553.5	108.0
1.1.4 AUXILIARY AUTO	6.3													283.5	283.5	0.0
1.1.5 ARMAMENT	297.1													4,159.5	4,161.7	-2.2
1.1.6 BODY/CAB	300.0													3,887.2	3,851.2	36.0
1.1.7 COMMUNICATIONS	50.5													1,927.7	1,937.2	-9.5
1.1.8 INTEG & ASSEM	20.1													3,574.3	3,574.7	-0.4
1.2 SYS PROGRAM MGT	295.7													15,843.4	15,823.2	20.2
1.3 SYS TEST & EVAL	0.0													2,492.3	2,492.3	0.0
1.4 TRAINING	0.0													0.0	0.0	0.0
1.5 SYS DATA	17.7	16.5	18.4	-1.2	-1.9	72.3	67.3	76.3	-5.0	-9.0				846.3	846.3	0.0
1.6 PEC SUPT EQUIP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				1,410.7	1,410.7	0.0
1.9 SPARES & REP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				5,707.3	5,707.3	0.0
b. COST OF MONEY	15.2	12.5	39.0	-2.7	-26.5	151.0	149.0	162.2	-2.0	-13.2				821.8	821.8	0.0
c. GENERAL AND ADMINISTRATIVE	148.2	121.0	192.6	-27.2	-71.6	1,450.6	1,437.7	1,558.4	-12.9	-120.7				8,462.7	8,450.8	11.9
d. UNDISTRIBUTED BUDGET														0	0	0
e. SUBTOTAL (PERFORMANCE MEASUREMENT BASELINE)	2,051.3	1,598.2	2,131.7	-453.1	-533.5	11,346.3	10,064.7	10,887.6	-1,281.6	-822.9				63,439.2	63,289.4	149.8
f. MANAGEMENT RESERVE														1,272.30		
g. TOTAL	2,051.3	1,598.2	2,131.7	-453.1	-533.5	11,346.3	10,064.7	10,887.6	-1,281.6	-822.9				64,711.5		
9. RECONCILIATION TO CONTRACT BUDGET BASE																
a. VARIANCE ADJUSTMENT									0.0	0.0						
b. TOTAL CONTRACT VARIANCE									-1,281.6	-822.9				64,711.5	63,289.4	1,422.1

Format 1 provides summary level data to measure cost and schedule performance using a Work Breakdown Structure (WBS) layout. Format 1 is required for all contracts requiring EVM. All data is at cost (except Format 1 Box 5 Price Data)

Unclassified

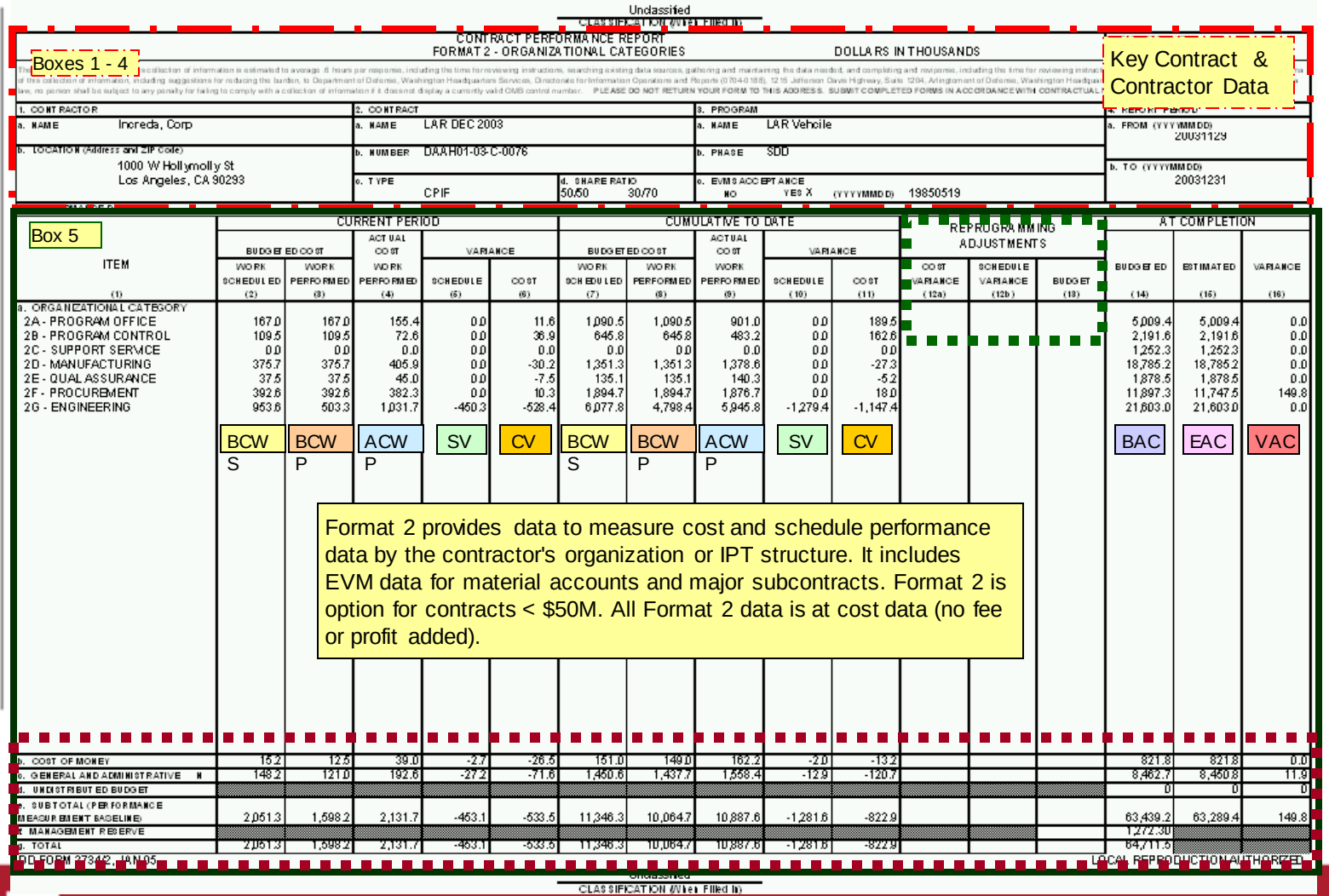
CLASSIFICATION (When Filled In)

Format 2 Changes

- Organizational categories can differ between Format 2 & 4 with Government concurrence

- G&A, COM, MR, and UB in Format 2 require consistency to Format 1.

Sample Performance Report – Format 2



Unclassified

CLASSIFICATION (When Filled In)

CONTRACT PERFORMANCE REPORT

FORMAT 2 - ORGANIZATIONAL CATEGORIES

DOLLARS IN THOUSANDS

Boxes 1 - 4

Key Contract & Contractor Data

1. CONTRACTOR	2. CONTRACT	3. PROGRAM	4. REPORT PERIOD
a. NAME Increda, Corp	a. NAME LAR DEC 2003	a. NAME LAR Vehcile	a. FROM (YYYYMMDD) 20031129
b. LOCATION (Address and ZIP Code) 1000 W Hollymolly St Los Angeles, CA 90293	b. NUMBER DAAH01-03-C-0076	b. PHASE SDD	b. TO (YYYYMMDD) 20031231
	c. TYPE CPIF	d. SHARE RATIO 50/50 30/70	e. EVMS ACCEPTANCE NO YES X (YYYYMMDD) 19850519

Box 5

ITEM	CURRENT PERIOD					CUMULATIVE TO DATE					REPROGRAMMING ADJUSTMENTS			AT COMPLETION		
	BUDGETED COST		ACTUAL COST	VARIANCE		BUDGETED COST		ACTUAL COST	VARIANCE							
	WORK SCHEDULED	WORK PERFORMED	WORK PERFORMED	SCHEDULE	COST	WORK SCHEDULED	WORK PERFORMED	WORK PERFORMED	SCHEDULE	COST	COST VARIANCE	SCHEDULE VARIANCE	BUDGET	BUDGETED	ESTIMATED	VARIANCE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12a)	(12b)	(13)	(14)	(15)	(16)
a. ORGANIZATIONAL CATEGORY																
2A - PROGRAM OFFICE	167.0	167.0	155.4	0.0	11.6	1,090.5	1,090.5	901.0	0.0	189.5				5,009.4	5,009.4	0.0
2B - PROGRAM CONTROL	109.5	109.5	72.6	0.0	36.9	645.8	645.8	483.2	0.0	162.6				2,191.6	2,191.6	0.0
2C - SUPPORT SERVICE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				1,252.3	1,252.3	0.0
2D - MANUFACTURING	375.7	375.7	405.9	0.0	-30.2	1,351.3	1,351.3	1,378.6	0.0	-27.3				18,785.2	18,785.2	0.0
2E - QUAL ASSURANCE	37.5	37.5	45.0	0.0	-7.5	135.1	135.1	140.3	0.0	-5.2				1,878.5	1,878.5	0.0
2F - PROCUREMENT	392.6	392.6	382.3	0.0	10.3	1,894.7	1,894.7	1,876.7	0.0	18.0				11,897.3	11,747.5	149.8
2G - ENGINEERING	963.6	503.3	1,031.7	-460.3	-528.4	6,077.8	4,798.4	5,945.8	-1,279.4	-1,147.4				21,603.0	21,603.0	0.0
	BCWS	BCWP	ACWP	SV	CV	BCWS	BCWP	ACWP	SV	CV				BAC	EAC	VAC
b. COST OF MONEY	15.2	12.5	39.0	-2.7	-26.5	151.0	149.0	162.2	-2.0	-13.2				821.8	821.8	0.0
c. GENERAL AND ADMINISTRATIVE	148.2	121.0	192.6	-27.2	-71.6	1,460.6	1,437.7	1,558.4	-12.9	-120.7				8,462.7	8,450.8	11.9
d. UNDISTRIBUTED BUDGET														0	0	0
e. SUBTOTAL (PERFORMANCE MEASUREMENT BASELINE)	2,051.3	1,598.2	2,131.7	-453.1	-533.5	11,346.3	10,064.7	10,887.6	-1,281.6	-822.9				63,439.2	63,289.4	149.8
f. MANAGEMENT RESERVE														1,272.30		
g. TOTAL	2,051.3	1,598.2	2,131.7	-453.1	-533.5	11,346.3	10,064.7	10,887.6	-1,281.6	-822.9				64,711.5		

Format 2 provides data to measure cost and schedule performance data by the contractor's organization or IPT structure. It includes EVM data for material accounts and major subcontracts. Format 2 is option for contracts < $50M. All Format 2 data is at cost data (no fee or profit added).

DD FORM 2734/2, JAN 05

LOCAL REPRODUCTION AUTHORIZED

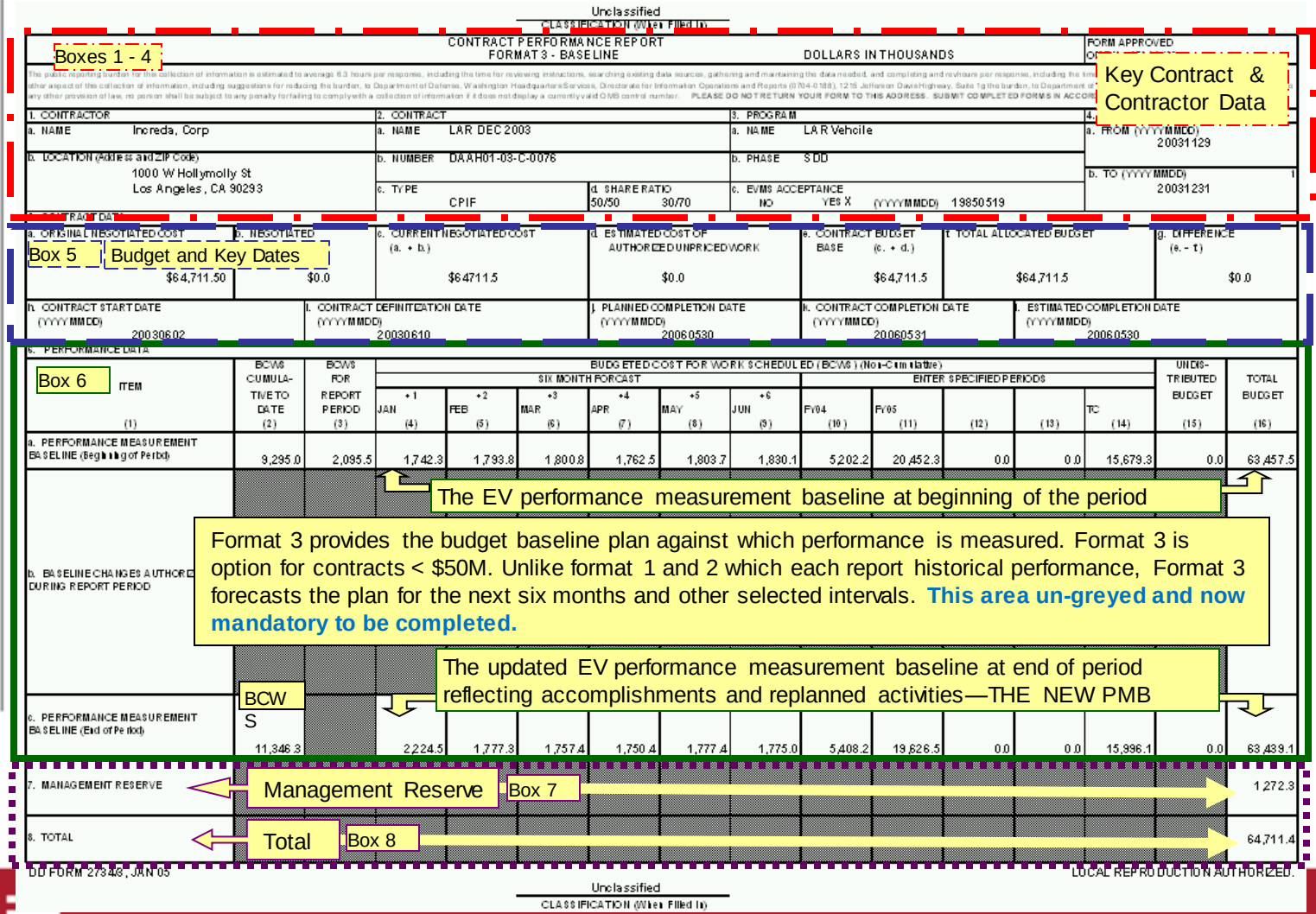
Unclassified

CLASSIFICATION (When Filled In)

Format 3 Changes

- Defined “Definitization date” to be the date the contract was originally definitized
- Improved definition of date representation during formal reprogramming
- “Un-grayed” monthly baseline change row to now be required for completion.

Sample Performance Report – Format 3



Unclassified

CLASSIFICATION (When Filled In)

CONTRACT PERFORMANCE REPORT
FORMAT 3 - BASELINE
DOLLARS IN THOUSANDS

FORM APPROVED

Boxes 1 - 4

Key Contract & Contractor Data

1. CONTRACTOR	2. CONTRACT	3. PROGRAM	4.
a. NAME Increda, Corp	a. NAME LAR DEC 2003	a. NAME LAR Vehicle	a. FROM (YYYYMMDD) 20031129
b. LOCATION (Address and ZIP Code) 1000 W Hollymolly St Los Angeles, CA 90293	b. NUMBER DAAH01-03-C-0076	b. PHASE SDD	b. TO (YYYYMMDD) 20031231
	c. TYPE CPIF	d. SHARE RATIO 50/50 30/70	c. EVMS ACCEPTANCE NO YES X (YYYYMMDD) 19850519

Box 5 Budget and Key Dates

a. ORIGINAL NEGOTIATED COST	b. NEGOTIATED	c. CURRENT NEGOTIATED COST (a. + b.)	d. ESTIMATED COST OF AUTHORIZED UNPRICED WORK	e. CONTRACT BUDGET BASE (c. + d.)	f. TOTAL ALLOCATED BUDGET	g. DIFFERENCE (e. - f.)
$64,711.50	$0.0	$64711.5	$0.0	$64,711.5	$64,711.5	$0.0

h. CONTRACT START DATE (YYYYMMDD)	i. CONTRACT DEFINITIZATION DATE (YYYYMMDD)	j. PLANNED COMPLETION DATE (YYYYMMDD)	k. CONTRACT COMPLETION DATE (YYYYMMDD)	l. ESTIMATED COMPLETION DATE (YYYYMMDD)
20030602	20030610	20060530	20060531	20060530

c. PERFORMANCE DATA

Box 6

ITEM (1)	BCWS CUMULATIVE TO DATE (2)	BCWS FOR REPORT PERIOD (3)	BUDGETED COST FOR WORK SCHEDULED (BCWS) (Non-Cumulative) SIX MONTH FORCAST +1 JAN (4)	+2 FEB (5)	+3 MAR (6)	+4 APR (7)	+5 MAY (8)	+6 JUN (9)	ENTER SPECIFIED PERIODS FY04 (10)	FY05 (11)	(12)	(13)	TC (14)	UNDISTRIBUTED BUDGET (15)	TOTAL BUDGET (16)
a. PERFORMANCE MEASUREMENT BASELINE (Beginning of Period)	9,295.0	2,095.5	1,742.3	1,793.8	1,800.8	1,762.5	1,803.7	1,830.1	5,202.2	20,452.3	0.0	0.0	15,679.3	0.0	63,457.5
b. BASELINE CHANGES AUTHORIZED DURING REPORT PERIOD															
c. PERFORMANCE MEASUREMENT BASELINE (End of Period)	BCWS 11,346.3		2,224.5	1,777.3	1,757.4	1,750.4	1,777.4	1,775.0	5,408.2	19,626.5	0.0	0.0	15,996.1	0.0	63,439.1
7. MANAGEMENT RESERVE															1,272.3
8. TOTAL															64,711.4

The EV performance measurement baseline at beginning of the period

Format 3 provides the budget baseline plan against which performance is measured. Format 3 is option for contracts < $50M. Unlike format 1 and 2 which each report historical performance, Format 3 forecasts the plan for the next six months and other selected intervals. **This area un-greyed and now mandatory to be completed.**

The updated EV performance measurement baseline at end of period reflecting accomplishments and replanned activities—THE NEW PMB

Management Reserve Box 7

Total Box 8

DD FORM 2734/8, JAN 05

LOCAL REPRODUCTION AUTHORIZED.

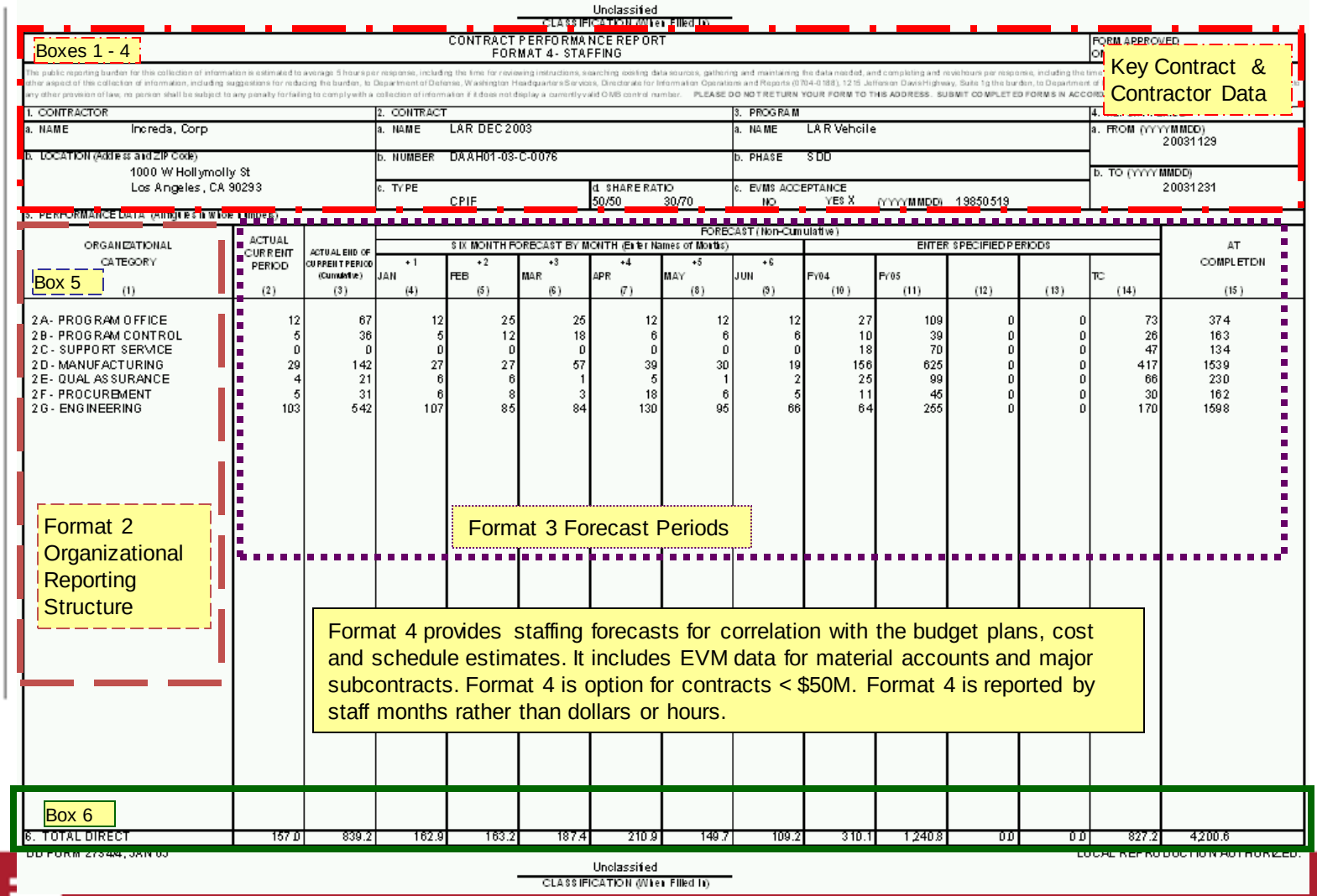
Unclassified

CLASSIFICATION (When Filled In)

Format 4 Changes

- Organizational categories can differ between Formats 2 & 4 with Government concurrence
- Staffing estimate required to be consistent with the “Column 15” EAC shown in Format 1
- CDRL will define thresholds for any staffing forecast changes that need to be addressed in Format 5.

Sample Performance Report – Format 4



Unclassified
CLASSIFICATION (When Filled In)

CONTRACT PERFORMANCE REPORT
FORMAT 4- STAFFING

Boxes 1 - 4

Key Contract & Contractor Data

FORM APPROVED
OMB

The public reporting burden for the collection of information is estimated to average 5 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1g the burden, to Department of any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR FORM TO THIS ADDRESS. SUBMIT COMPLETED FORMS IN ACCORD

1. CONTRACTOR	2. CONTRACT	3. PROGRAM	4.
a. NAME Increda, Corp	a. NAME LAR DEC 2003	a. NAME LAR Vehicle	a. FROM (YYYYMMDD) 20031129
b. LOCATION (Address and ZIP Code) 1000 W Hollymolly St Los Angeles, CA 90293	b. NUMBER DAAH01-03-C-0076	b. PHASE SDD	b. TO (YYYYMMDD) 20031231
	c. TYPE CPIF d. SHARE RATIO 50/50 30/70	c. EVMS ACCEPTANCE NO YES X (YYYYMMDD) 19850519	

5. PERFORMANCE DATA (Amounts in Whole Dollars)

Box 5

ORGANIZATIONAL CATEGORY (1)	ACTUAL CURRENT PERIOD (2)	ACTUAL END OF CURRENT PERIOD (Cumulative) (3)	FORECAST (Non-Cumulative) SIX MONTH FORECAST BY MONTH (Enter Names of Months) +1 JAN (4)	+2 FEB (5)	+3 MAR (6)	+4 APR (7)	+5 MAY (8)	+6 JUN (9)	ENTER SPECIFIED PERIODS FY04 (10)	FY05 (11)	(12)	(13)	TC (14)	AT COMPLETION (15)
2A- PROGRAM OFFICE	12	67	12	25	25	12	12	12	27	109	0	0	73	374
2B- PROGRAM CONTROL	5	36	5	12	18	6	6	6	10	39	0	0	26	163
2C- SUPPORT SERVICE	0	0	0	0	0	0	0	0	18	70	0	0	47	134
2D- MANUFACTURING	29	142	27	27	57	39	30	19	156	625	0	0	417	1539
2E- QUAL ASSURANCE	4	21	6	6	1	5	1	2	25	99	0	0	66	230
2F- PROCUREMENT	5	31	6	8	3	18	6	5	11	45	0	0	30	162
2G- ENGINEERING	103	542	107	85	84	130	95	66	64	255	0	0	170	1598
6. TOTAL DIRECT	157.0	839.2	162.9	163.2	187.4	210.9	149.7	109.2	310.1	1,240.8	0.0	0.0	827.2	4,200.6

Box 6

Format 2 Organizational Reporting Structure

Format 3 Forecast Periods

Format 4 provides staffing forecasts for correlation with the budget plans, cost and schedule estimates. It includes EVM data for material accounts and major subcontracts. Format 4 is option for contracts < $50M. Format 4 is reported by staff months rather than dollars or hours.

DD FORM 2734/4, JAN 05

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Format 5 Changes

- Variance Analysis Limited to Top 15 Elements by Cost/Sched/VAC (language intent clarified)
- Options for additional elements allowed on a temporary basis without CDRL change
- Variance Requirements enhanced for SRA, Margin, IMS, Format 3, Cost and Schedule Analysis language
- IMS Analysis –Defined level of detail, type of analysis, and overall language tightening
- EAC Analysis – Impact of schedule on EAC Analysis
- Any difference between Most Likely Management EAC and CBB
- UB & MR Analysis –Reworded UB analysis to be the balance as of current period and not current balance in the period
- Specified requirement of analysis of MR transactions, not simply MR.

Sample Performance Report – Format 5

Unclassified

Boxes 1 - 4

CONTRACT PERFORMANCE REPORT
FORMAT 5 - EXPLANATIONS AND PROBLEM ANALYSES

Key Contract & Contractor Data

1. CONTRACTOR	2. CONTRACT	3. PROGRAM	4. REPORT PERIOD
a. NAME Increda, Corp	a. NAME LAR DEC 2003	a. NAME LAR Vehicle	a. FROM (YYYYMMDD) 20031129
b. LOCATION (Address and ZIP Code) 1000 W Hollymolly St Los Angeles, CA 90293	b. NUMBER DAAH01-03-C-0076	b. PHASE SDD	b. TO (YYYYMMDD) 20031231
	c. TYPE CPIF d. SHARE RATIO 50/50 30/70	c. EVMS ACCEPTANCE NO YES X (YYYYMMDD) 19850519	

5. EVALUATION

Box 5

Discussion should include but is not limited to:

- Summary Analysis
  - Summary of Overall Contract Variances
  - Changes in Management Reserve
  - Changes in Undistributed Budget
  - Differences between EAC's (Blocks 6.a, 6.b, 6.c, or Block 8.15) (Format 1)
  - Significant timephasing shifts in Baseline (BCWS) (Format 3)
  - Significant timephasing shifts or Overall Changes in Forecasted Staffing (Format 4)
  - Discussion of Over Target Baseline and/or Over Target Schedule incorporation

- Analysis of Significant Variances: (identify and describe each)
  - Type and Magnitude of Variance
  - Explanation of Significant Reasons
  - Effect on Immediate Task
  - Effect on Total Contract
  - Corrective Actions Taken or Planned

Format 5 is a narrative report used to explain significant cost and schedule variances and other identified contract problems and topics. It is mandatory for all EVMS contracts. Research has indicated that two thirds of the costs associated with EVMS can de attributed to variance analysis reporting.

DD FORM 2734/5, JAN 05

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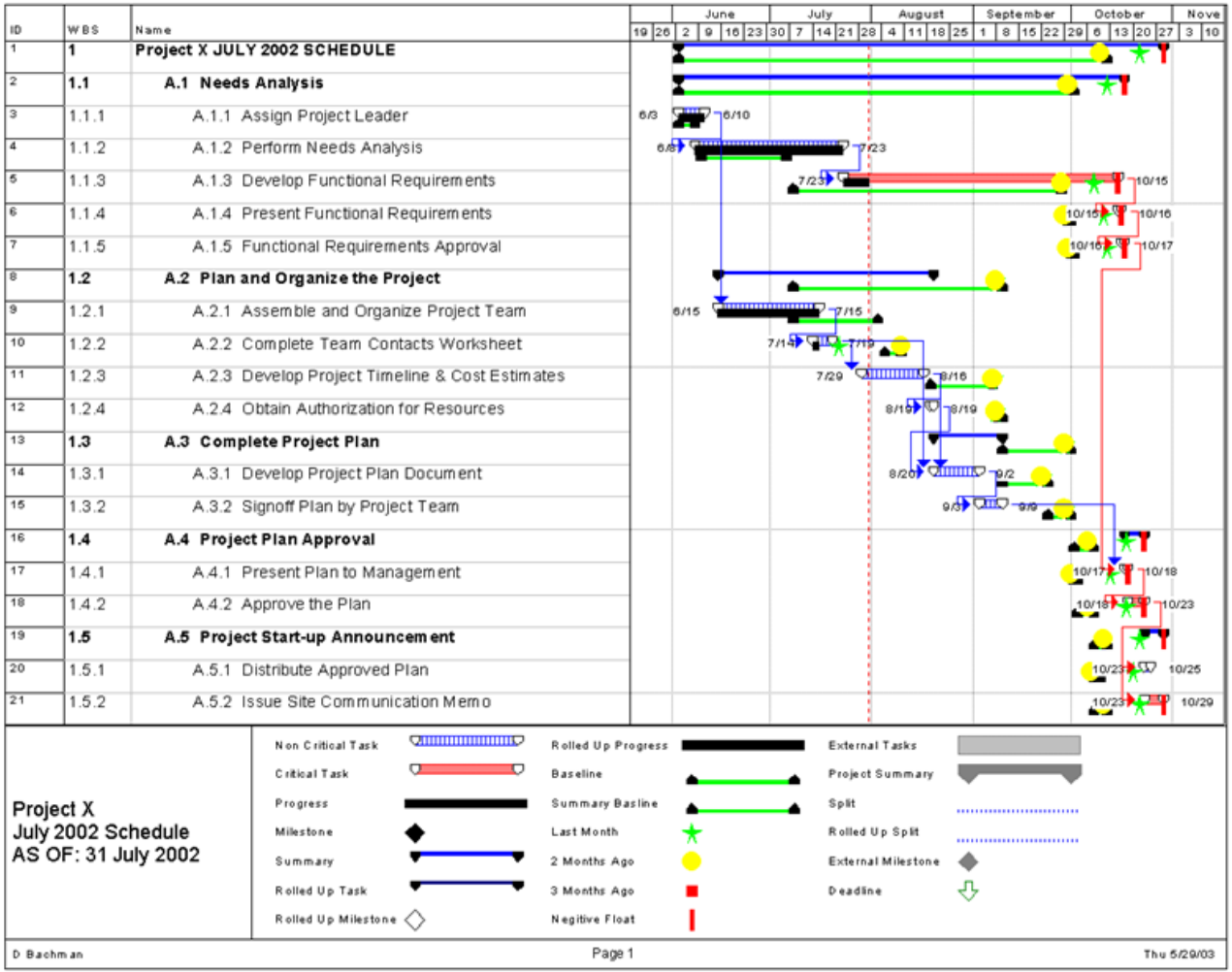
Format 6 Changes

- Schedule Risk Assessments –More clearly defines three point estimates
- Linked results to risk management process
- Detailed schedules shall include all…necessary to create a networked schedule…identifying a valid critical path
- Summary schedule can be sorted by either the WBS or IMP structure (if applicable)
- "The WBS numbering system in the IMS must be consistent with the Format 1 structure."
- Schedule Margin allowed before program events
  - Removal of "difference between contractual milestone date(s) and the planned date(s) of accomplishment."
  - Critical & Driving Paths –Includes definition that tasks with "0" or negative total float are not by default the critical path
    - Driving path and interim milestones defined
    - Excessive constraints and incomplete, incorrect, or overly constrained logic shall be avoided
    - Relationships & Float –Relationship justifications removed
      - All non-constrained discrete tasks/activities/milestones shall have at least one predecessor and successor, except the start and end of the program
      - The IMS shall contain all calendars that define working and nonworking time periods or other information that may impact the schedule
      - Require justification of late constraints (MSO, MFO, FNLT, SNLT)
      - Require justification of early constraints that are 20 WD later than the status date (SNET, FNET)
      - Allow for a note field or a code defined in the Data Dictionary

Sample Contract IMS – Format 6



ID	WBS	Name
1	1	**Project X JULY 2002 SCHEDULE**
2	1.1	**A.1 Needs Analysis**
3	1.1.1	A.1.1 Assign Project Leader
4	1.1.2	A.1.2 Perform Needs Analysis
5	1.1.3	A.1.3 Develop Functional Requirements
6	1.1.4	A.1.4 Present Functional Requirements
7	1.1.5	A.1.5 Functional Requirements Approval
8	1.2	**A.2 Plan and Organize the Project**
9	1.2.1	A.2.1 Assemble and Organize Project Team
10	1.2.2	A.2.2 Complete Team Contacts Worksheet
11	1.2.3	A.2.3 Develop Project Timeline & Cost Estimates
12	1.2.4	A.2.4 Obtain Authorization for Resources
13	1.3	**A.3 Complete Project Plan**
14	1.3.1	A.3.1 Develop Project Plan Document
15	1.3.2	A.3.2 Signoff Plan by Project Team
16	1.4	**A.4 Project Plan Approval**
17	1.4.1	A.4.1 Present Plan to Management
18	1.4.2	A.4.2 Approve the Plan
19	1.5	**A.5 Project Start-up Announcement**
20	1.5.1	A.5.1 Distribute Approved Plan
21	1.5.2	A.5.2 Issue Site Communication Memo

Format 7 (New requirement)

- Annual requirement
- Provides supplemental electronic UN/CEFACT historical and time-phased info
- Minimum data elements:
  - Monthly historical time-phased BCWS, BCWP, ACWP, ETC, by CA WBS
  - Future forecast of BCWS and ETC
  - Must reconcile with Format 1 same report month
  - The data is not to be integrated with Format 5 variance analysis, but is intended to enhance analysis.

Summary of Policy Changes

- DFARS 252.234-7002
  - Revised May 2011
  - i(3)(iv) CO discretion to disapprove system:
    - If validation not completed within specified timeframe
    - If ONE or more significant deficiencies exist in ONE or more high risk guidelines (1, 3, 6, 7, 8, 9, 10, 12, 16, 21, 23, 26, 27, 28, 30, or 32)

- DFARS 252.234-7005
  - Revised Feb 2012
  - (d)(2) CO issues final determination of significant deficiencies
    - Will include a notice to withhold payments
  - (e)(2) Provides guidance on withholding process

- Integrated Program Management Report (IPMR) DID (DI-MGMT-81861)
  - Approved 20 June 2012…Effective 1 July 2012
  - Replaces DI-MGMT-81466 (CPR) & DI-MGMT-81650 (IMS)
  - Combines CPR and IMS DIDs into one

EVM Guidance and Policy

	Government	Industry
Policy	- DoDI 5000.2 - OSD Policy Letter, Feb 2015	N/A
Guidance	- Defense Acquisition Guidebook	N/A
Implementation Guidance	- Earned Value Management Implementation Guide (EVMIG) - Earned Value Management System Interpretation Guide (EVMSIG)	N/A
Validation	- EVMIG - DCMA Agency Instructions	- NDIA Systems Acceptance Handbook
Surveillance	- DCMA Agency Instructions - DCAA Standard Audit Programs	- NDIA Surveillance Handbook
Integrated Baseline Reviews	- Program Managers' Guide to IBR Process - Agency handbooks and training material	- The Program Managers' Guide to IBR Process
Standards	N/A	- EIA-748 Intent Guide
Standard Interpretation	N/A	- EIA 748 Intent Guide

Acronyms

- ACWP = Actual Cost Work of Performed
- APB = Acquisition Program Baseline
- BES = Budget Estimate Submission
- BCWP = Budgeted Cost of Work Performed
- BCWS = Budgeted Cost of Work Scheduled
- BAC = Budget at Complete
- CAM = Control Account Manager
- CCDR = Contractor Cost Data Report
- CDD = Capabilities Development Document
- CFSR = Contractor Funds Status Report
- CPD = Capabilities Production Document
- CPI = Cost Performance Index
- CPI_{Cum} = Cost Performance Index Cumulative
- CPR = Contract Performance Report
- CV = Cost Variance
- CWBS = Contractor Work Breakdown Structure
- DAES = Defense Acquisition Executive Summary
- DCAA = Defense Contract Audit Agency
- DCMA = Defense Contract Management Agency
- DFAS = Defense Finance & Accounting Service
- DoD = Department of Defense
- EAC = Estimate at Complete
- EV = Earned Value
- EVM = Earned Value Management
- EVMS = Earned Value Management System
- ICD = Initial Capabilities Document
- IMP = Integrated Master Plan
- IMS = Integrated Master Schedule
- IPM = Integrated Program Management
- IPT = Integrated Project Team
- KPP = Key Performance Parameter
- MR = Management Reserve
- OSD = Office of the Secretary of Defense
- OTB = Over Target Baseline
- PAC = Price at Complete
- PMB = Performance Measurement Baseline
- PMO = Program Management Office
- POM = Program Objectives Memorandum
- RAM = Responsibility Assignment Matrix
- RFP = Request for Proposal
- SAR = Selected Acquisition Report
- SOW = Statement of Work
- SPA = Single Point Adjustment
- SPI = Schedule Performance Index
- SV = Schedule Variance
- TPM = Technical Performance Measurement
- TR = Technical Report
- UB = Undistributed Budget
- WBS = Work Breakdown Structure

Cost/Schedule Variance Trends Chart

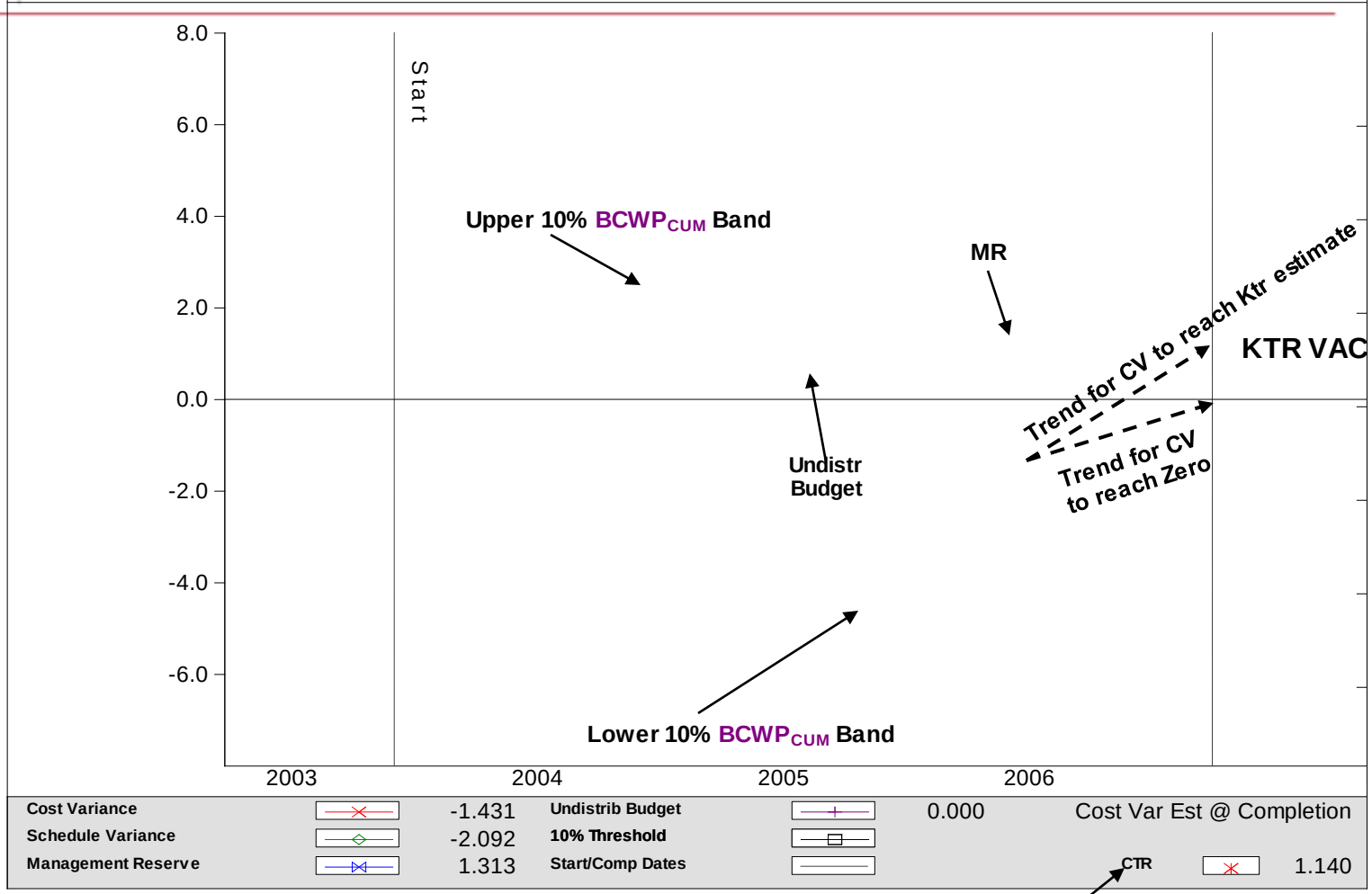
(aka "Cone Chart")

1. If the Cost Variance (BCWP - ACWP) is less than 0.0, then the contractor has spent more than planned to accomplish the tasks. If sloping downward, then the amount overspent / overrun is increasing. Conversely, if the CV is more than 0, then the contractor has spent less than planned.
2. If the Schedule Variance (BCWP - BCWS) is less than 0.0, then the contractor has taken longer than planned to accomplish the tasks. If this sloping downward, then even fewer tasks are getting completed than planned. This DOES NOT necessarily mean that the contract is behind schedule. The network schedule must also be consulted to determine if these tasks are on the critical path before making assumptions about schedule impact.
3. Conversely, if the SV is more than 0.0, then the contractor has accomplished tasks sooner than planned. (If the contractor has a large number of 50/50 work packages, a positive SV could also result from contractor opening work packages early.)

   NOTE: At contract completion, SV will always be 0.0 because, at that point, BCWS will equal BCWP.
   It is also important to look for changes in trends. Frequently negative SV trends are followed by negative CV trends.
4. Normally, the BEST that the contractor can do is to flatten the CV trend. This means that there are no additional overruns. It is rare that the contractor will spend LESS than planned in the future (causing the trend to track up) if the trend to date is a negative one. For this reason, if the CV trend needs to turn UP drastically to reach the PMO or Contractor VAC, this is highly unlikely to happen and would require a good explanation as to how this could occur. (See dotted lines on chart.)
5. As previously mentioned, the SV will eventually trend back upward to 0, when the contract tasks are all complete, and at that point in time, BCWP will equal BCWS. (This does NOT mean the these tasks will be completed according to the original plan / schedule, only that they will EVENTUALLY be completed and earned value taken.)
6. Use of Management Reserve (MR) is also something to track. Early use of MR is generally a indication of planning problems.
7. The +/- 10% thresholds bands provide perspective of the relative significance of the cost & schedule variances. The goal is to stay within these "cones."

Cost/Schedule Variance Trends
Contractor: Increda, Corp
Contract: LAR EMD 2003

DAAH01-03-C-0076 CPIF EMD
Program: LAR Vehicle
AS OF: DEC 05



Cumulative Variance Chart

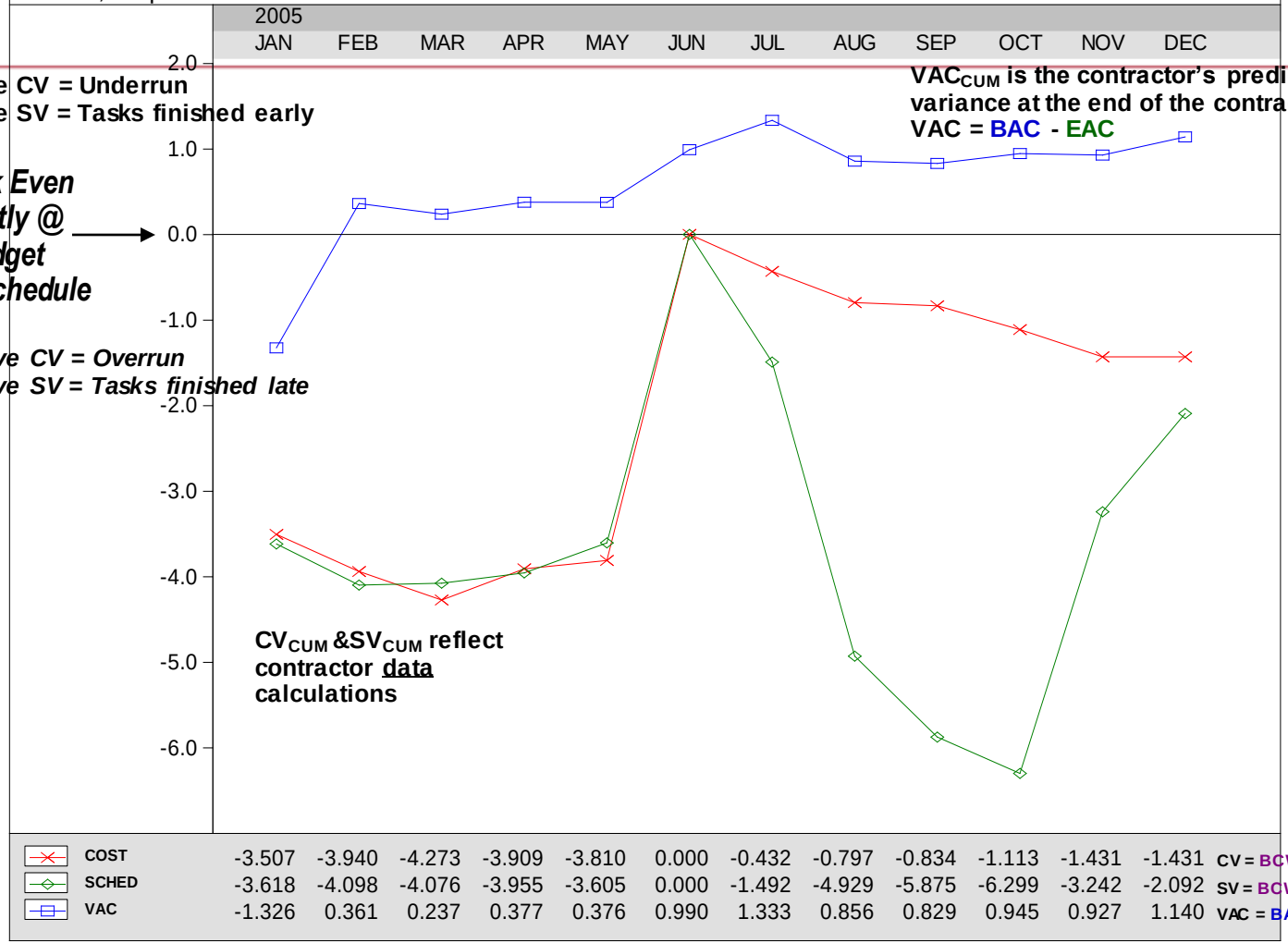
1. If the Cost Variance (BCWP - ACWP) is less than 0.0, then the contractor has spent more than planned to accomplish the tasks. If this is sloping downward, then the amount overspent / overrun is increasing. Conversely, if the CV is more than 0, then the contractor has spent less than planned.

2. If the Schedule Variance (BCWP - BCWS) s less than 0.0, then the contractor has taken longer than planned to accomplish the tasks. If this sloping downward, then even fewer tasks are getting completed than planned. Conversely, if the SV is more than 0.0, then the contractor has accomplished tasks sooner than planned. NOTE: At contract completion, the SV will always be 0.0 because, at that point, BCWS will equal BCWP.

3. This chart also compares the CV_{CUM} trend with the contractor's predicted Variance at Completion (VAC = BAC - EAC). If these are approximately the same, then the contractor's EAC is reasonable based on the CV trend data. If the VAC is more than the CV & the trends are 'diverging', then it becomes less likely that the Contractor's EAC can be achieved. If they are 'converging', then the EAC is becoming more achievable based on the trends.

Note: Cost & Schedule Variance formulas both start with BCWP.

Cumulative Variance
Increda, Corp DAAH01-03-C-0076 CPIF EMD
Name: LAR Element: 1



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
COST	-3.507	-3.940	-4.273	-3.909	-3.810	0.000	-0.432	-0.797	-0.834	-1.113	-1.431	-1.431	CV = BCWP - ACWP
SCHED	-3.618	-4.098	-4.076	-3.955	-3.605	0.000	-1.492	-4.929	-5.875	-6.299	-3.242	-2.092	SV = BCWP - BCWS
VAC	-1.326	0.361	0.237	0.377	0.376	0.990	1.333	0.856	0.829	0.945	0.927	1.140	VAC = BAC - EAC

Compare VAC to CV trend; Is CV trending toward VAC or away?

Cost Performance Index Chart

1. $CPI_{CUM} = \frac{BCWP_{CUM}}{ACWP_{CUM}}$ Has the contractor's cost efficiency been as planned (1.00), less than 100% efficient (< 1.00) or better than 100% efficient (>1.00). CPI is based on actuals to date

2. You should be able to identify the general trend of the contractor's CPI. If it is sloping downward, it is getting worse. If it is sloping upward, it is getting better.

3. When dealing with the TCPI (future efficiency needed to achieve a cost target), you should understand from looking at the formulas, that the SMALLER the BAC or EAC, the GREATER the efficiency needed to achieve it.

   TCPI (for BAC) = $\frac{Work\ Remaining}{Budget\ Remaining} = \frac{BAC - BCWP}{BAC - ACWP}$ An EAC is reasonable if TCPI and CPI are w/in +- .05

   TCPI (for EAC) = $\frac{Work\ Remaining}{Budget\ Remaining} = \frac{BAC - BCWP}{EAC - ACWP}$ Beyond +- .05, the EAC is conservative or optimistic

   (Note: In the EAC formula, you may substitute either the contractor's EAC (or LRE) or the PMO / government EAC to determine the TCPI for that EAC.)

4. One way to determine the reasonableness of an EAC, is to compare the TCPI to achieve the EAC (or BAC) to the contractor's performance efficiency to date, which is the CPI_{CUM}.

5. If the Contractor's CPI_{CUM} is greater than the TCPI, than the EAC (or BAC) is more likely to be achievable than if the contractor's CPI_{CUM} is less than the TCPI because the contractor will need to be more efficient than they have been up to this point.

6. If the trend lines of the CPI_{CUM} & TCPI for the EAC (or BAC) are diverging, then the likelihood of the contractor achieving that cost target is decreasing because the gap between the contractor's performed efficiency and the efficiency needed to reach the cost goal is getting greater.

7. Plain Language Definitions –

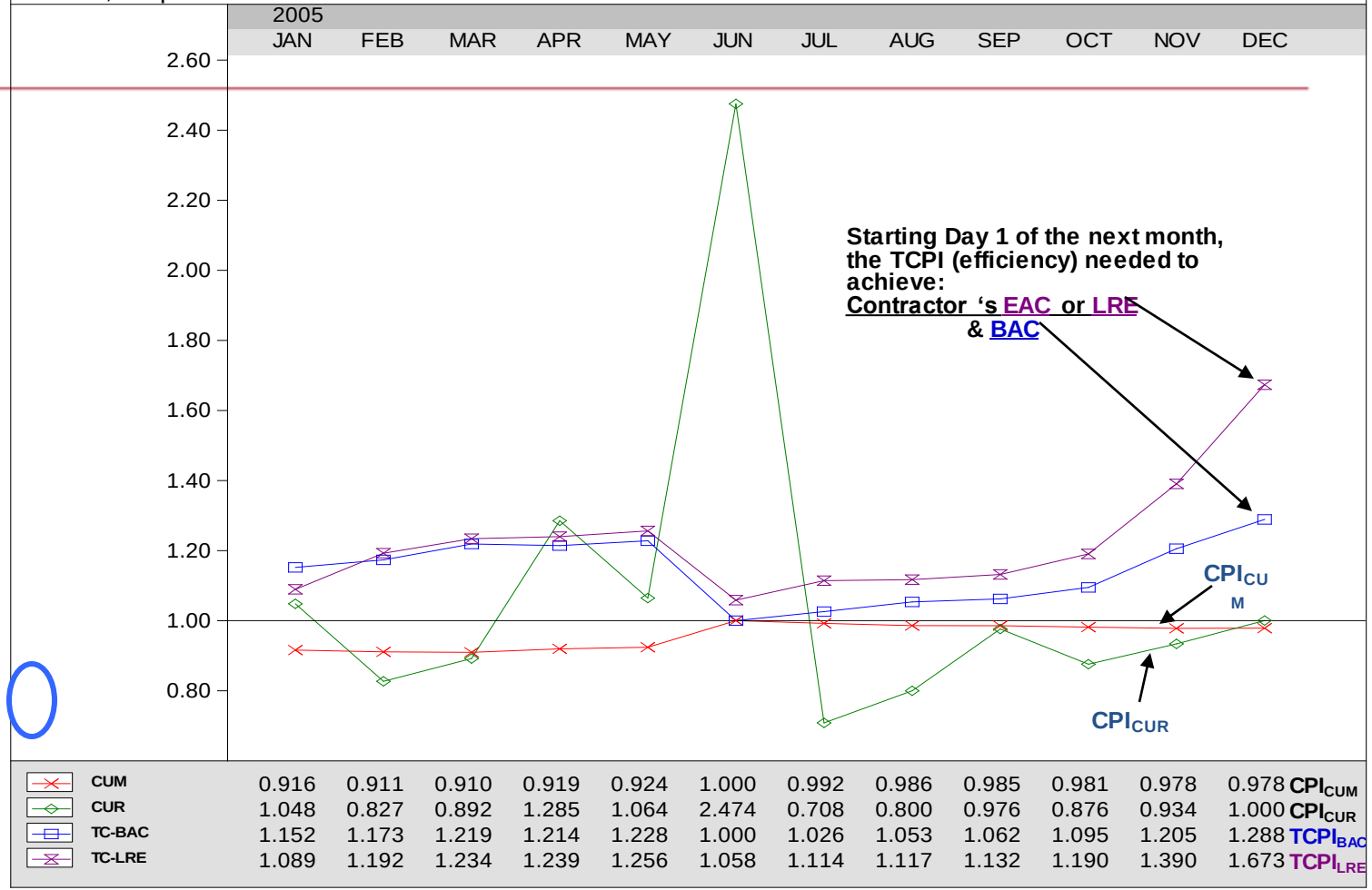
   CPI: Given a CPI of 0.95, for every dollar spent, 95 cents of work or earned value was realized.

   TCPI: Given a TCPI of 1.15, for every dollar spent from here to the end of the contract, one dollar and 15 cents of work or earned value must be realized to achieve the stated target

Cost Performance Index

Increda, Corp DAAH01-03-C-0076 CPIF EMD

Name: LAR Element: 1



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
CUM	0.916	0.911	0.910	0.919	0.924	1.000	0.992	0.986	0.985	0.981	0.978	0.978	CPI_{CUM}
CUR	1.048	0.827	0.892	1.285	1.064	2.474	0.708	0.800	0.976	0.876	0.934	1.000	CPI_{CUR}
TC-BAC	1.152	1.173	1.219	1.214	1.228	1.000	1.026	1.053	1.062	1.095	1.205	1.288	$TCPI_{BAC}$
TC-LRE	1.089	1.192	1.234	1.239	1.256	1.058	1.114	1.117	1.132	1.190	1.390	1.673	$TCPI_{LRE}$

- $TCPI_{BAC} = \frac{\text{WORK REMAINING}}{\text{BUDGET REMAINING}} = \frac{BAC - BCWP_{CUM}}{BAC - ACWP_{CUM}}$
- $TCPI_{EAC} = \frac{\text{WORK REMAINING}}{\text{BUDGET REMAINING}} = \frac{BAC - BCWP_{CUM}}{EAC - ACWP_{CUM}}$

* Compare contractor's efficiency CPI_{CUM} to the efficiency needed to meet the BAC ($TCPI_{BAC}$) & contractor EAC ($TCPI_{EAC}$)

Estimates at Completion Chart

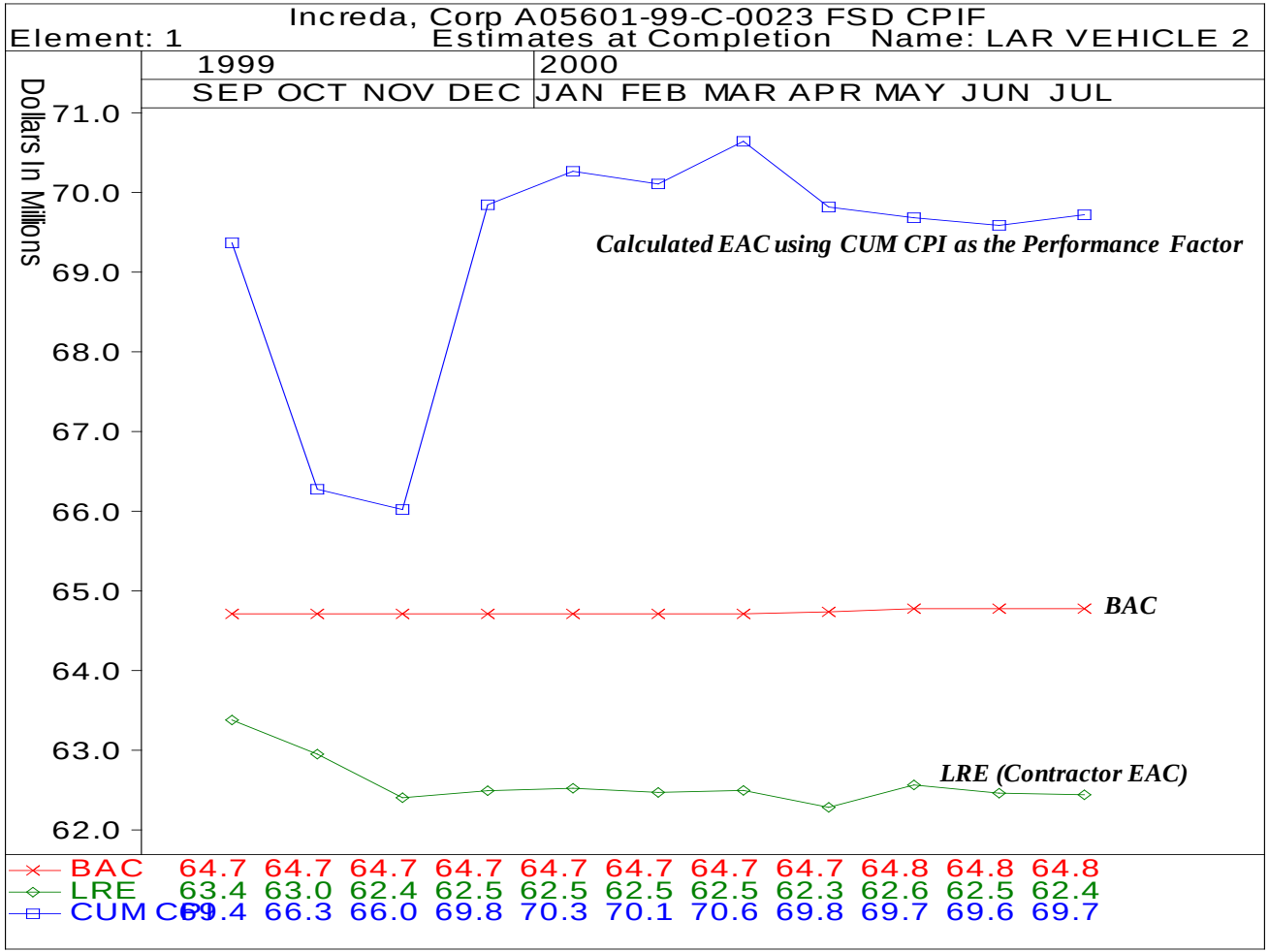
1. The Estimates at Completion chart compares the contractor's baseline (BAC) with the contractor's EAC (or LRE). The contractor's EAC is one way of determining what the contract may actually cost versus the original plan.

2. This chart can also display one or more of the CALCULATED EACs based on the basic EAC formula:

$$EAC = ACWP + \left(\frac{BAC - BCWP}{\text{Performance Factor}}\right)$$

3. The EAC may be calculated using a number of different performance factors by substituting different efficiency factors for the performance factor in the basic formula. No one factor is "better" than another. The choice of efficiency factor is based on program history, current trends, technical performance and other programmatic information. (In this standard chart format, the performance factor used is CPI_{CUM}.)

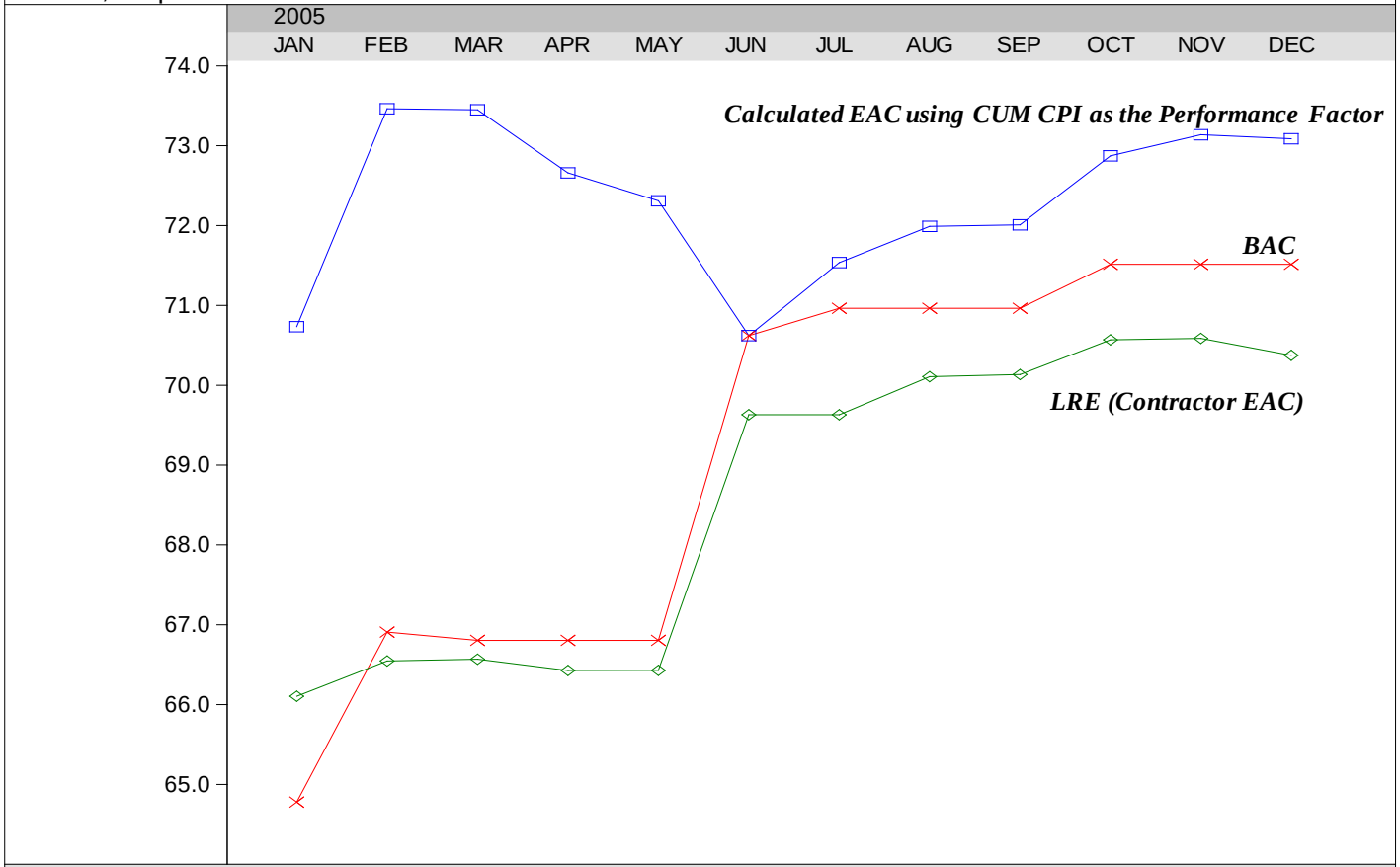
4. EACs are used to assist in management decision making and planning. They are frequently included in reports made to upper levels of management including budget documents. If the calculated EACs differ greatly from the BAC and contractor EAC (aka LRE), then the contractor and/or the PMO should be prepared to explain why. Based on years of experience, OSD considers after 20% of contract progress, the EAC using the


Increda, Corp A05601-99-C-0023 FSD CPIF
Element: 1
Estimates at Completion
Name: LAR VEHICLE 2
1999
2000
SEP OCT NOV DEC JAN FEB MAR APR MAY JUN JUL
Dollars In Millions
71.0
70.0
69.0
68.0
67.0
66.0
65.0
64.0
63.0
62.0
Calculated EAC using CUM CPI as the Performance Factor
BAC
LRE (Contractor EAC)
BAC 64.7 64.7 64.7 64.7 64.7 64.7 64.7 64.7 64.8 64.8 64.8
LRE 63.4 63.0 62.4 62.5 62.5 62.5 62.5 62.3 62.6 62.5 62.4
CUM CPI 69.4 66.3 66.0 69.8 70.3 70.1 70.6 69.8 69.7 69.6 69.7

Estimates at Completion

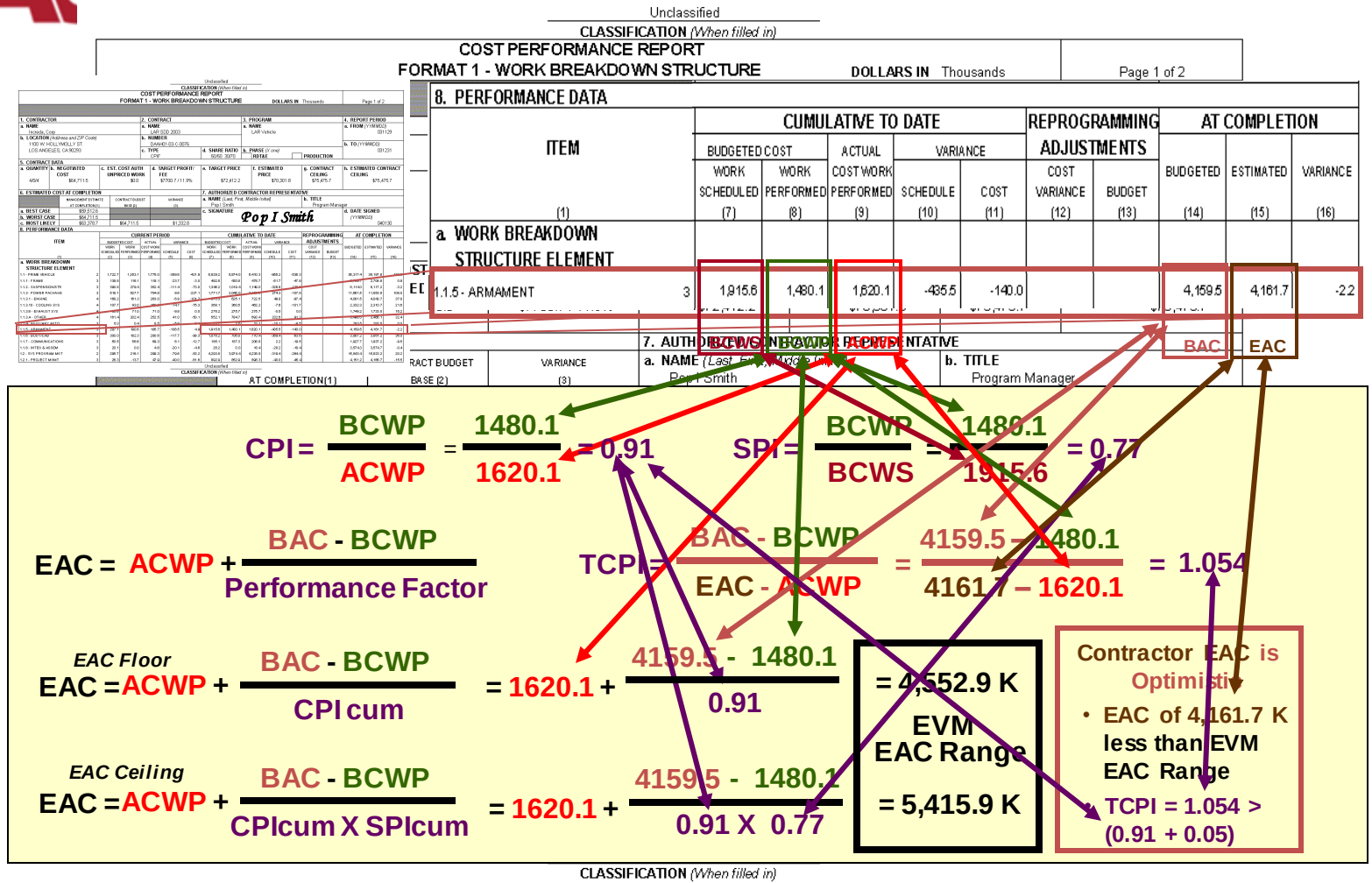
Increda, Corp DAAH01-03-C-0076 CPIF EMD

Name: LAR Element: 1



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
BAC	64.78	66.91	66.80	66.80	66.80	70.62	70.96	70.96	70.96	71.51	71.51	71.51
LRE	66.10	66.55	66.57	66.43	66.43	69.63	69.63	70.10	70.13	70.56	70.58	70.37
CUM CPI	70.73	73.46	73.44	72.65	72.30	70.62	71.53	71.99	72.00	72.87	73.13	73.08

COMPUTING AN EVM EAC RANGE FOR A WBS ELEMENT



$$CPI = \frac{BCWP}{ACWP} = \frac{1480.1}{1620.1} = 0.91 \qquad SPI = \frac{BCWP}{BCWS} = \frac{1480.1}{1915.6} = 0.77$$

$$EAC = ACWP + \frac{BAC - BCWP}{\text{Performance Factor}} \qquad TCPI = \frac{BAC - BCWP}{EAC - ACWP} = \frac{4159.5 - 1480.1}{4161.7 - 1620.1} = 1.054$$

EAC Floor

$$EAC = ACWP + \frac{BAC - BCWP}{CPI\,cum} = 1620.1 + \frac{4159.5 - 1480.1}{0.91} = 4{,}552.9\ K$$

EAC Ceiling

$$EAC = ACWP + \frac{BAC - BCWP}{CPIcum \times SPIcum} = 1620.1 + \frac{4159.5 - 1480.1}{0.91 \times 0.77} = 5{,}415.9\ K$$

EVM EAC Range

Contractor EAC is Optimistic

- EAC of 4,161.7 K less than EVM EAC Range
- TCPI = 1.054 > (0.91 + 0.05)